AXIOMTEK

# MANO111 Series

**AMD Embedded R-Series APU**
**Mini ITX SBC**

**User's Manual**

RoHS

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If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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## ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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# Table of Contents

**Disclaimers** ..... **ii**
**ESD Precautions** ..... **iii**

Chapter 1 Introduction ..... 1

**1.1 Features** ..... **1**
**1.2 Specifications** ..... **2**
**1.3 Utilities Supported** ..... **3**

Chapter 2 Board and Pin Assignments ..... 5

**2.1 Board Dimensions and Fixing Holes** ..... **5**
**2.2 Board Layout** ..... **8**
**2.3 Jumper Settings** ..... **10**
2.3.1 COM4 Data/Power Selection (JP2) ..... 12
2.3.2 COM3 Data/Power Selection (JP3) ..... 12
2.3.3 COM2 Data/Power Selection (JP4) ..... 12
2.3.4 COM1 Data/Power Selection (JP5) ..... 12
2.3.5 TPM Normal Operation/Special Commands Selection (JP6) ..... 13
2.3.6 Auto Power On (JP7) ..... 13
2.3.7 Restore BIOS Optimal Defaults (JP10) ..... 13
2.3.8 LVDS Brightness Control Mode Setting (JP11) ..... 13
2.3.9 LVDS Voltage Selection (JP12 and JP13) ..... 14
2.3.10 COM1 RS-232/422/485 Mode Setting (JP14, JP15, JP16) ..... 14
**2.4 Connectors** ..... **15**
2.4.1 COM Connectors (CN1, CN2, CN3 and CN5) ..... 16
2.4.2 Power Connector (CN4) ..... 17
2.4.3 PCI-Express Mini Card Connector (CN6) ..... 17
2.4.4 SIM Card Slot (CN7) ..... 18
2.4.5 Inverter Connector (CN8) ..... 18
2.4.6 USB Connectors (CN9 and CN10) ..... 19
2.4.7 LVDS Connector (CN11) ..... 20
2.4.8 LAN and USB Connector (CN12) ..... 22
2.4.9 Dual DVI-D Connector (CN13) ..... 23
2.4.10 USB and DisplayPort Connectors (CN14~15 and CN18~19) ..... 24
2.4.11 High Rise D-Sub and LAN Connectors (CN16 and CN20) ..... 26
2.4.12 Six Terminal Earphone Jack (CN17) ..... 26
2.4.13 FAN Connectors (FAN1, FAN2 and FAN3) ..... 27
2.4.14 Digital I/O Connector (JP1) ..... 27
2.4.15 Front Panel Connector (JP8) ..... 28
2.4.16 Serial ATA Connectors (SATA1, SATA2, SATA3 and SATA4) ..... 29
2.4.17 CFast™ Socket (SCN1) ..... 29

Chapter 3 Hardware Installation ..... 31
3.1 Installing the Processor ..... 31
3.2 Installing the Memory ..... 34
Chapter 4 Hardware Description ..... 35
4.1 APU (Accelerated Processing Unit) ..... 35
4.2 BIOS ..... 35
4.3 System Memory ..... 35
4.4 I/O Port Address Map ..... 36
4.5 Interrupt Controller (IRQ) Map ..... 38
4.6 Memory Map ..... 39
Chapter 5 AMI BIOS Setup Utility ..... 41
5.1 Starting ..... 41
5.2 Navigation Keys ..... 41
5.3 Main Menu ..... 42
5.4 Advanced Menu ..... 43
5.5 Chipset Menu ..... 51
5.6 Boot Menu ..... 54
5.7 Security Menu ..... 55
5.8 Save & Exit Menu ..... 56
Appendix A Watchdog Timer ..... 59
About Watchdog Timer ..... 59
How to Use Watchdog Timer ..... 59
Sample Program ..... 60
Appendix B Digital I/O ..... 61
About Digital I/O ..... 61
Digital I/O Programming ..... 61

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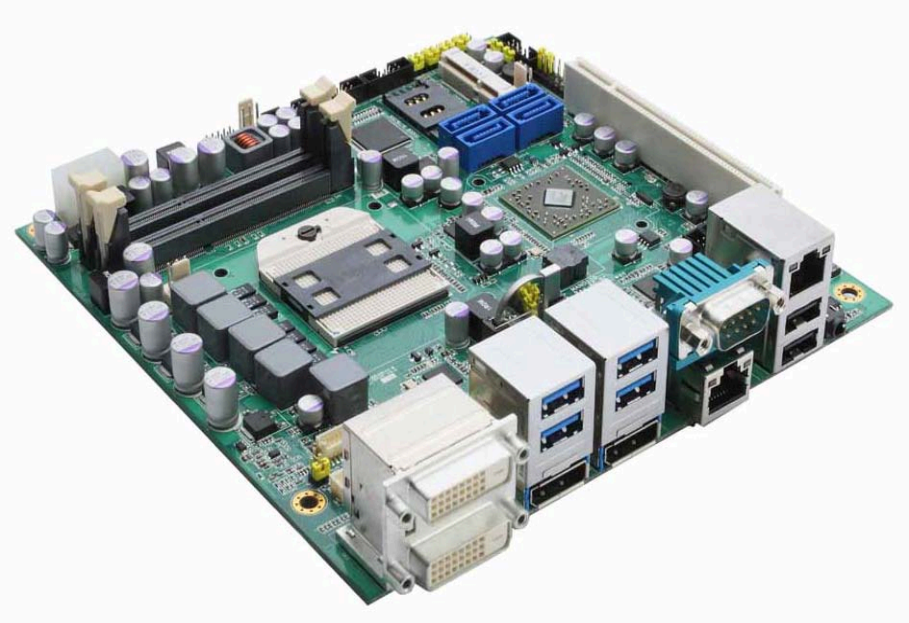
# Chapter 1
# Introduction



The MANO111 Series supports AMD R-Series APU. The board integrates the Fusion Controller Hub A75 and delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

There are two 204-pin unbuffered SO-DIMM sockets for dual channel DDR3 with frequency up to 1600MT/s, maximum memory capacity up to 16GB. It also features two Gigabit/Fast Ethernet ports, four serial ATA channels at maximum transfer rate up to 6Gb/s, four USB 3.0 and ten USB 2.0 high speed compliant, and built-in HD audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as 5 serial ports and Mini ITX form factor that supports an extensive array of PC peripherals.

## 1.1 Features

- FS1r2 socket AMD Embedded R-Series APU
- AMD A75 PCH
- Integrated graphics AMD Radeon HD 7 series
- DDR3 dual channel SO-DIMM 1333/1600 max. up to 16GB
- 4 SATA-600 support RAID 0, 1, 5 and 10
- 4 USB 3.0 supported
- 3 independent displays
- DisplayPort 2 supports multi-stream
- TPM 1.2 supported

## 1.2 Specifications

- **CPU**
  - AMD R-Series processor.

- **CPU Socket**
  - AMD FS1r2 socket.

- **System Chipset**
  - AMD A75 FCH.

- **BIOS**
  - American Megatrends Inc. BIOS.
  - 32Mbit SPI Flash, DMI, Plug and Play.
  - PXE Ethernet Boot ROM.
  - Support “Load Optimized Default” functionality to backup customized setting in BIOS flash chip to prevent from CMOS battery failure.

- **System Memory**
  - Two 204-pin unbuffered DDR3 SO-DIMM sockets.
  - Up to 16GB DDR3 1600MHz memory.

- **Onboard Multi I/O**
  - Controller: Nuvoton NCT6627UD.
  - Serial ports: Three RS-232 ports, one RS-232/422/485 port and one TTL port.

- **USB Interface**
  - Ten USB ports with fuse protection, comply with USB Spec. Rev.2.0.
  - Four USB 3.0 ports.

- **Serial ATA**
  - Four SATA-600 with RAID 0, 1, 5 and 10.

- **Display**
  - One 40-pin connector for 18/24-bit single/dual channel LVDS and one 8-pin inverter.
  - Two DisplayPorts.
  - Two DVI-D ports via a stacked DVI-D connector.

- **Ethernet**
  - LAN1 – Realtek RTL8111E Gigabit/Fast Ethernet.
  - LAN2 – Realtek RTL8111DP Gigabit/Fast Ethernet.

- **Audio**
  - Realtek High Definition audio codec ALC662.
  - Support 2.1 channel audio line-out as six terminal 3.50mm earphone jack.

- **Expansion Interface**
  - One PCI
  - One PCI-Express Mini Card socket which complies with PCI-Express Mini Card Spec. v1.2.
  - One SIM Card slot

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Watchdog Timer**
  - 1~255 seconds; up to 256 levels.

- **Form Factor**
  - 170 x 170mm Mini ITX form factor.

**Note**

***All specifications and images are subject to change without notice.***

## 1.3 Utilities Supported

- Chipset driver
- AHCI driver
- Ethernet driver
- Audio driver

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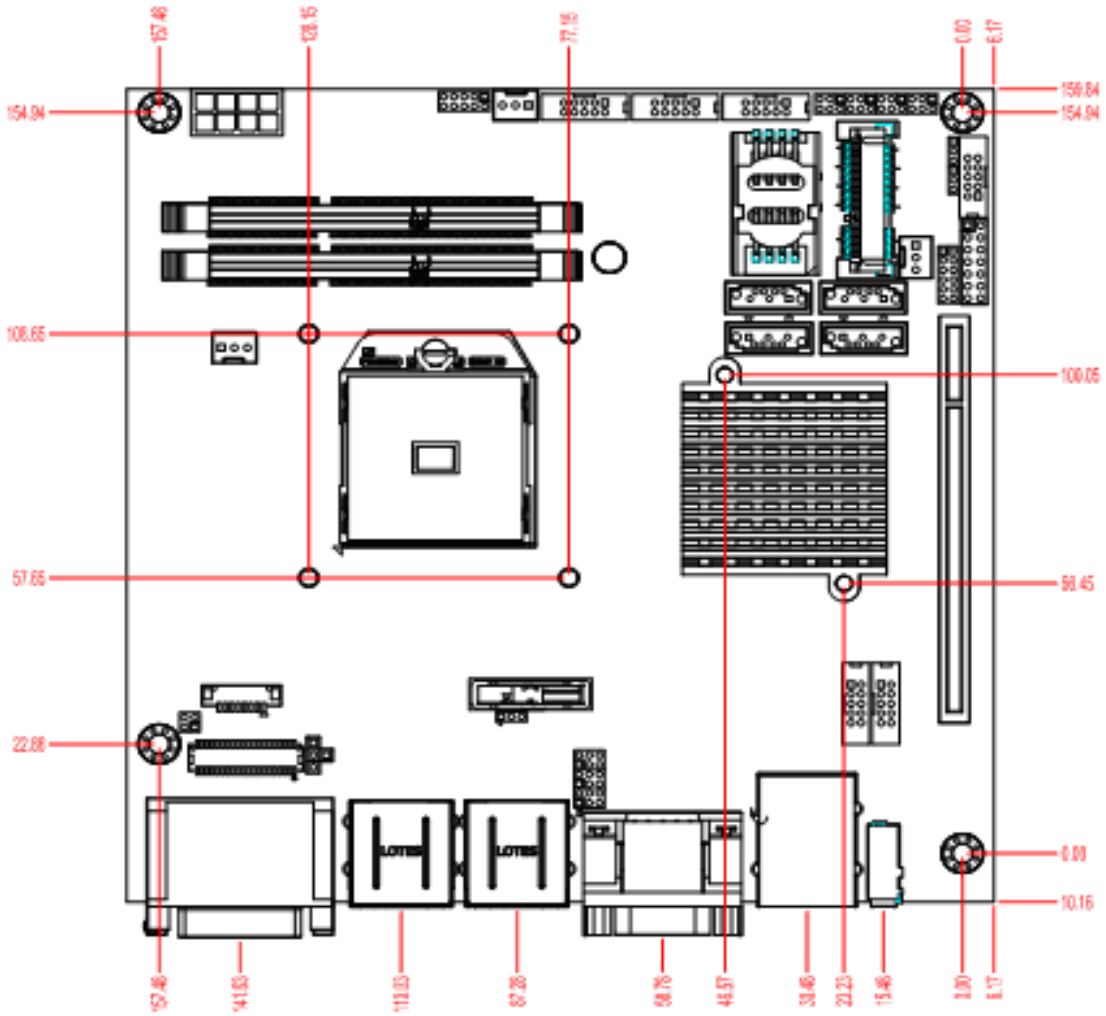
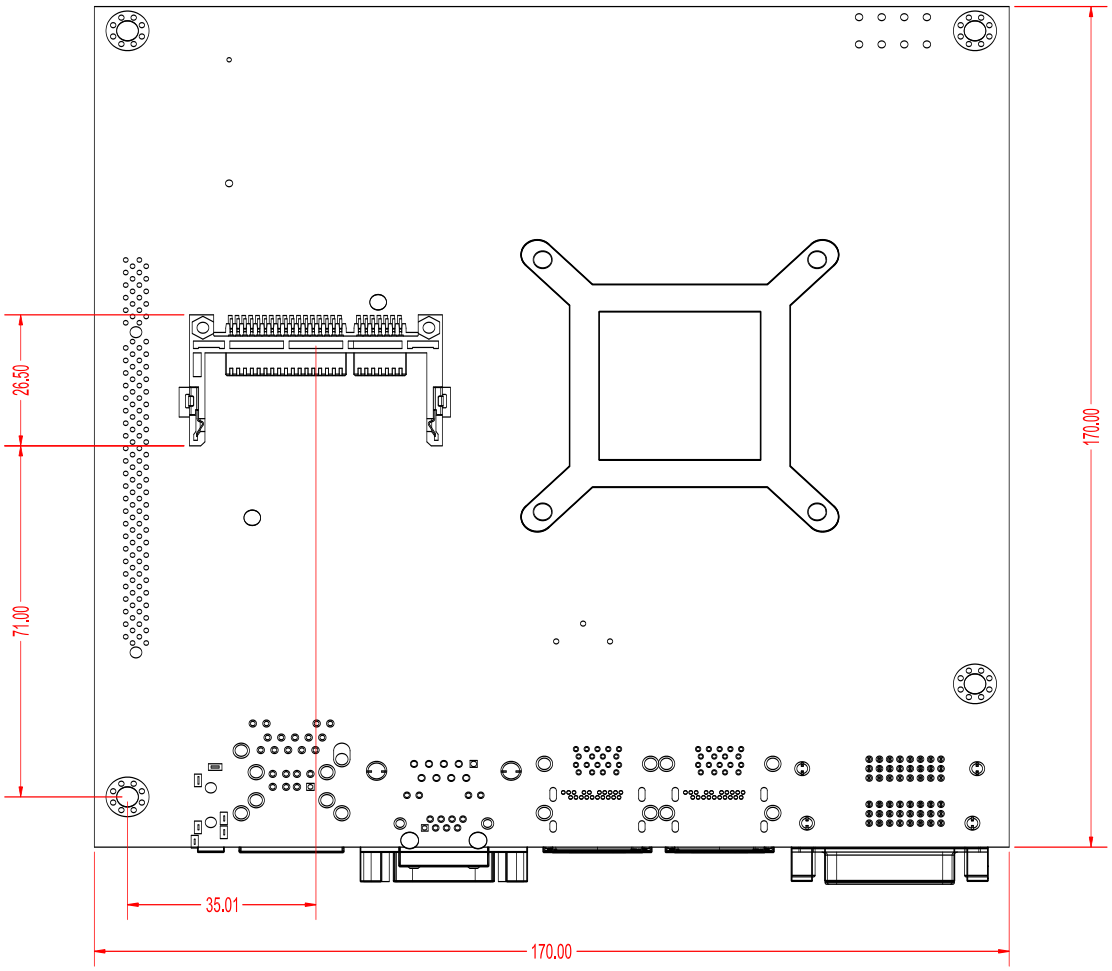
# Chapter 2
# Board and Pin Assignments

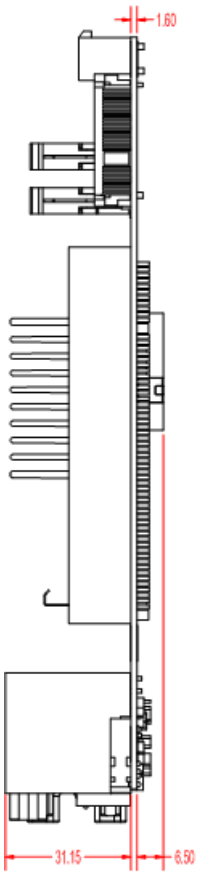
## 2.1 Board Dimensions and Fixing Holes




**Top View**

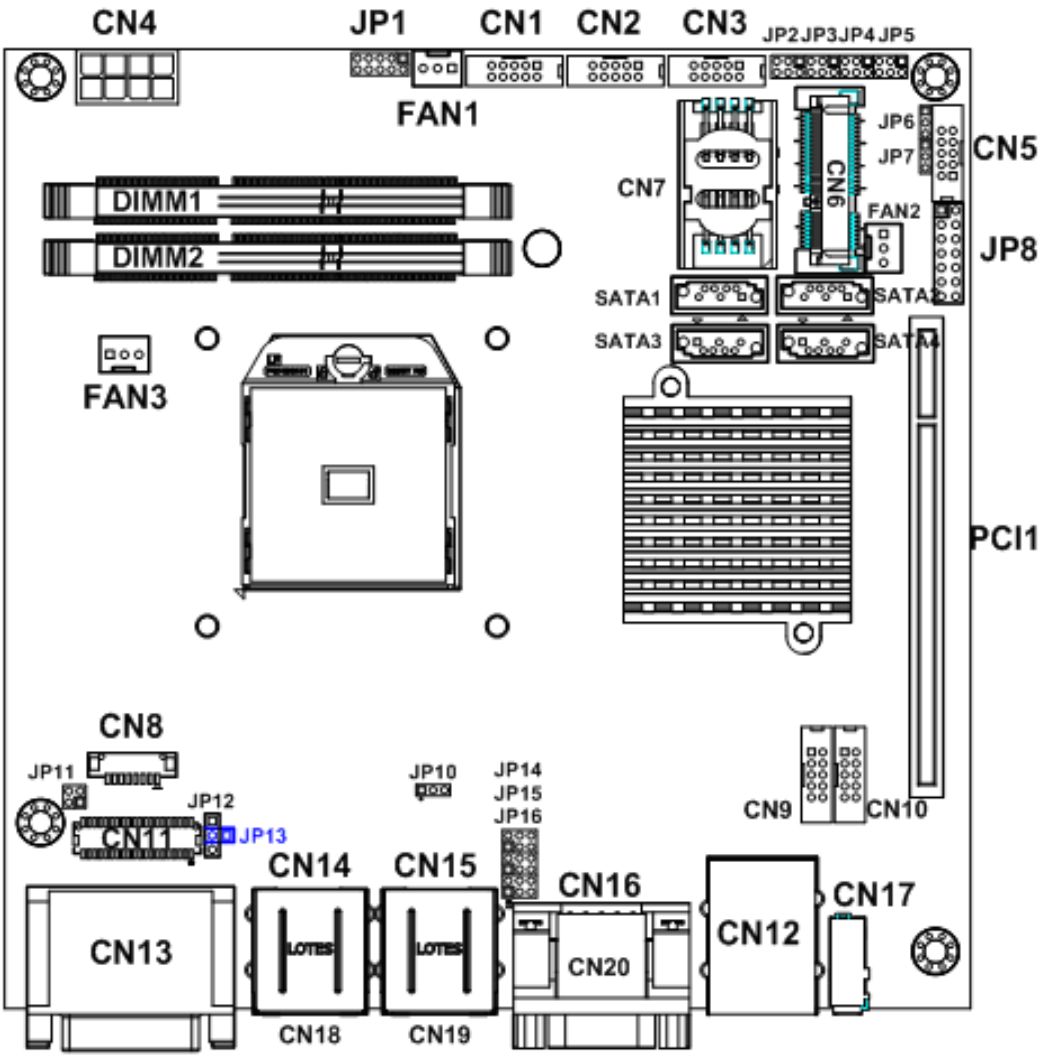



**Bottom View**

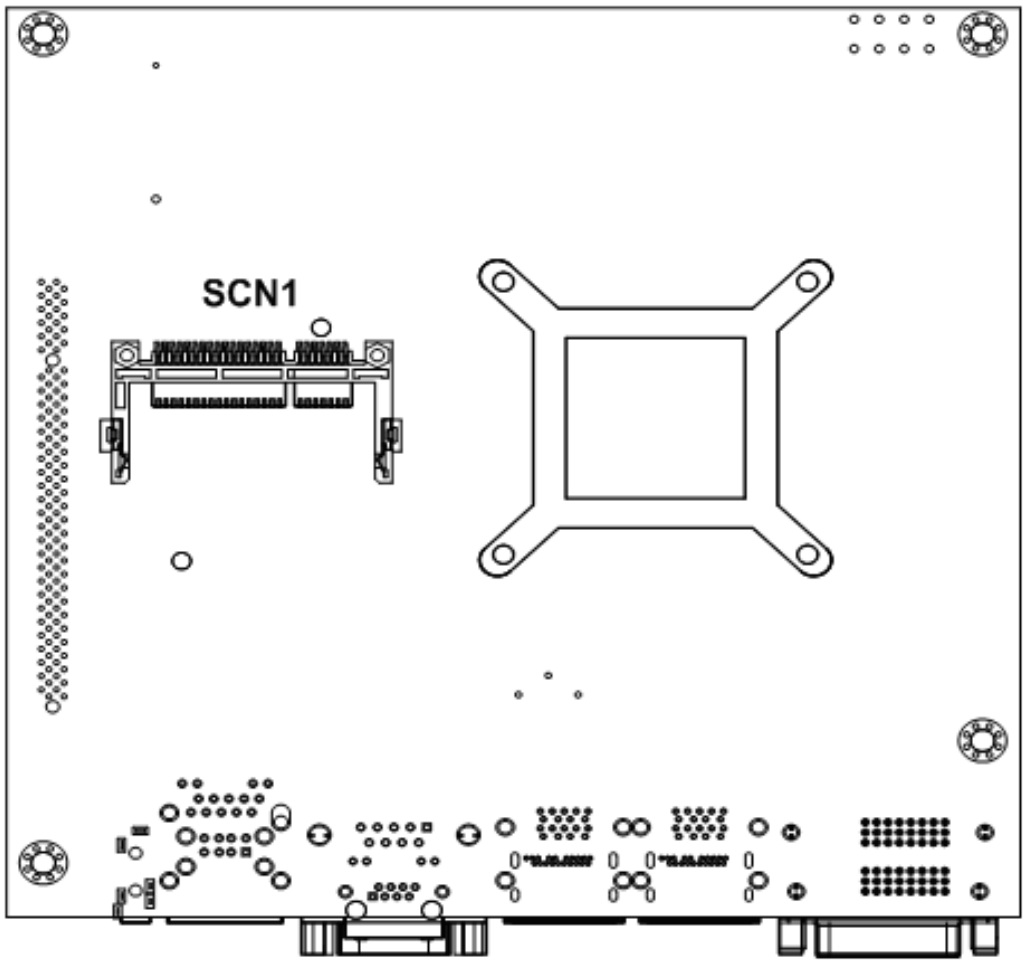



**Side View**

## 2.2 Board Layout



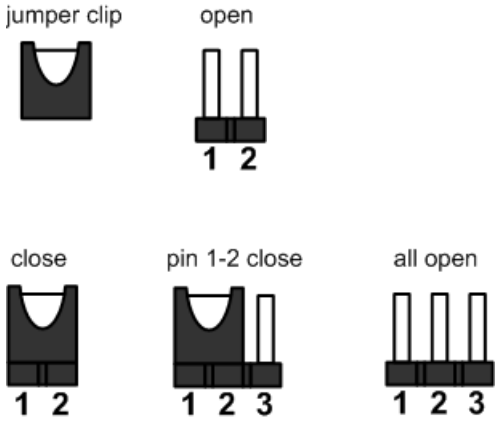

**Top View**




**Bottom View**

## 2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.




Before applying power to MANO111 Series, please make sure all of the jumpers are in factory default position. Below you can find a summary table and onboard default settings.

**Note**

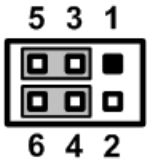
***Once the default jumper setting needs to be changed, please do it under power-off condition.***

| Jumper | Description | | Setting |
|---|---|---|---|
| JP2 | COM4 Data/Power Selection Default:<br>Default: RS-232 Data | CN3 Pin 1: DCD | 3-5 close |
| | | CN3 Pin 8: RI | 4-6 close |
| JP3 | COM3 Data/Power Selection<br>Default: RS-232 Data | CN2 Pin 1: DCD | 3-5 close |
| | | CN2 Pin 8: RI | 4-6 close |
| JP4 | COM2 Data/Power Selection<br>Default: RS-232 Data | CN1 Pin 1: DCD | 3-5 close |
| | | CN1 Pin 8: RI | 4-6 close |
| JP5 | COM1 Data/Power Selection<br>Default: RS-232 Data | CN16 Pin 1: DCD | 3-5 close |
| | | CN16 Pin 9: RI | 4-6 close |
| JP6 | TPM Normal Operation/Special Commands Selection<br>Default: Normal Operation | | 1-2 close |
| JP7 | Auto Power On<br>Default: Enable | | 1-2 close |
| JP10 | Restore BIOS Optimal Defaults<br>Default: Normal Operation | | 1-2 close |
| JP11 | LVDS Brightness Control Mode Setting<br>Default: PWM Mode | | 1-2 close |
| JP12 | +3.3V/+5V LVDS Voltage Selection<br>Default: +3.3V | | 1-2 close |
| JP13<br>(Optional) | +12V LVDS Voltage Selection | | Open |
| JP14 | COM1 RS-232/422/485 Mode Setting<br>Default: RS-232 | | 1-2 close |
| JP15 | | | 3-5, 4-6 close |
| JP16 | | | 3-5, 4-6 close |

### 2.3.1 COM4 Data/Power Selection (JP2)

The COM4 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

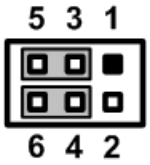
| Function | Setting |
|---|---|
| Power: Set CN3 pin 1 to +5V level | 1-3 close |
| Data: Set CN3 pin 1 to DCD (Default) | 3-5 close |
| Power: Set CN3 pin 8 to +12V level | 2-4 close |
| Data: Set CN3 pin 8 to RI (Default) | 4-6 close |




### 2.3.2 COM3 Data/Power Selection (JP3)

The COM3 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

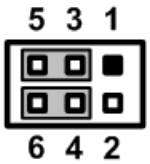
| Function | Setting |
|---|---|
| Power: Set CN2 pin 1 to +5V level | 1-3 close |
| Data: Set CN2 pin 1 to DCD (Default) | 3-5 close |
| Power: Set CN2 pin 8 to +12V level | 2-4 close |
| Data: Set CN2 pin 8 to RI (Default) | 4-6 close |




### 2.3.3 COM2 Data/Power Selection (JP4)

The COM2 port has +5V level power capability on DCD and +12V level on RI by setting this jumper.

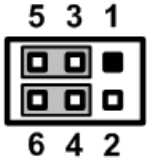
| Function | Setting |
|---|---|
| Power: Set CN1 pin 1 to +5V level | 1-3 close |
| Data: Set CN1 pin 1 to DCD (Default) | 3-5 close |
| Power: Set CN1 pin 8 to +12V level | 2-4 close |
| Data: Set CN1 pin 8 to RI (Default) | 4-6 close |




### 2.3.4 COM1 Data/Power Selection (JP5)

The COM1 port has +5V level power capability on DCD and +12V level on RI by setting this jumper. When COM1 is set to +5V or +12V level, please make sure the communication mode is RS-232 (see section 2.3.10).

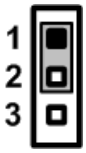
| Function | Setting |
|---|---|
| Power: Set CN16 pin 1 to +5V level | 1-3 close |
| Data: Set CN16 pin 1 to DCD (Default) | 3-5 close |
| Power: Set CN16 pin 9 to +12V level | 2-4 close |
| Data: Set CN16 pin 9 to RI (Default) | 4-6 close |



### 2.3.5 TPM Normal Operation/Special Commands Selection (JP6)

Use JP6 for TPM normal operation or special commands selection.

| Function | Setting |
|---|---|
| Normal operation (Default) | 1-2 close |
| Special Commands Enable | 2-3 close |




### 2.3.6 Auto Power On (JP7)

If JP7 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP7 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

| Function | Setting |
|---|---|
| Enable auto power on (Default) | 1-2 close |
| Disable auto power on | 2-3 close |

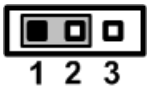
**Note**

***This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.***

### 2.3.7 Restore BIOS Optimal Defaults (JP10)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

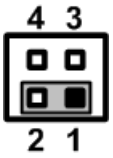
| Function | Setting |
|---|---|
| Normal operation (Default) | 1-2 close |
| Restore BIOS optimal defaults | 2-3 close |




### 2.3.8 LVDS Brightness Control Mode Setting (JP11)

The JP11 is enabled to select PWM or voltage control mode for inverter connector (CN8) pin 8. These two control modes are for adjusting LVDS brightness.

| Function | Setting |
|---|---|
| PWM mode (Default) | 1-2 close |
| Voltage mode | 3-4 close |

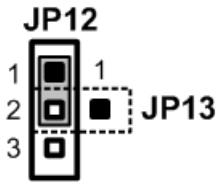


### 2.3.9 LVDS Voltage Selection (JP12 and JP13)

The board supports voltage selection for flat panel displays. Use JP12 to set LVDS connector (CN11) pin 1~6 VCCM to +3.3V or +5V voltage level. Use JP13 (optional) to set LVDS connector (CN11) pin 1~6 VCCM to +12V voltage level. To prevent hardware damage, before connecting please make sure that the input voltage of LVDS flat panel is correct.

| Function | JP12 Setting |
|---|---|
| +3.3V level (Default) | 1-2 close |
| +5V level | 2-3 close |

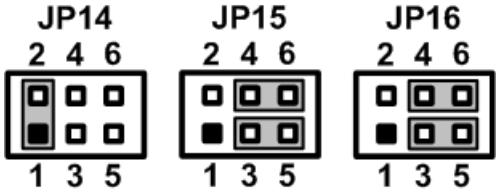
| Function | JP13 Setting |
|---|---|
| +12V level (Optional) | 1-2 close |




### 2.3.10 COM1 RS-232/422/485 Mode Setting (JP14, JP15, JP16)

Use these jumpers to set COM1 port to operate as RS-232, RS-422 or RS-485 communication mode. When these jumpers are set to operate as RS-422 or RS-485 mode, please make sure COM1 is on data mode (see section 2.3.4)

| Function | Setting |
|---|---|
| RS-232 mode (Default) | JP14 1-2 close<br>JP15 3-5, 4-6 close<br>JP16 3-5, 4-6 close |
| RS-422 mode | JP14 3-4 close<br>JP15 1-3, 2-4 close<br>JP16 1-3, 2-4 close |
| RS-485 mode | JP14 5-6 close<br>JP15 1-3, 2-4 close<br>JP16 1-3, 2-4 close |



## 2.4 Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

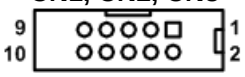
| Connector | Description |
|---|---|
| CN1~3 | COM2, COM3 and COM4 Connectors |
| CN4 | Power Connector |
| CN5 | COM5 Connector |
| CN6 | PCI-Express Mini Card Connector |
| CN7 | SIM Card Slot |
| CN8 | Inverter Connector |
| CN9 | USB 2.0 Wafer Port 8 and 9 Connector |
| CN10 | USB 2.0 Wafer Port 6 and 7 Connector |
| CN11 | LVDS Connector |
| CN12 | LAN2, USB 2.0 Port 4 and 5 Connector |
| CN13 | Dual DVI-D Connector |
| CN14~15 | High Rise Stacked USB Connectors |
| CN16 | High Rise D-Sub Connector |
| CN17 | Six Terminal Earphone Jack |
| CN18~19 | DisplayPort 1 and 2 Connectors |
| CN20 | LAN1 Connector |
| FAN1 | System Fan Connector |
| FAN2 | Fan Connector |
| FAN3 | CPU Fan Connector |
| JP1 | Digital I/O Connector |
| JP8 | Front Panel Connector |
| SATA1 | Serial ATA3 Connector |
| SATA2 | Serial ATA1 Connector |
| SATA3 | Serial ATA2 Connector |
| SATA4 | Serial ATA0 Connector |
| SCN1 | CFast™ Socket |

### 2.4.1 COM Connectors (CN1, CN2, CN3 and CN5)

These CN1 (for COM2), CN2 (for COM3) and CN3 (for COM4) have +5V level power capability on DCD and 12V level on RI by setting JP4 and JP3 and JP2, respectively (see section 2.3.3 and 2.3.2 and 2.3.1). The pin assignments are listed in the following table.

| Pin | CN1 Signal | Pin | CN1 Signal |
|---|---|---|---|
| 1 | DCD2 | 2 | DSR2 |
| 3 | RXD2 | 4 | RTS2 |
| 5 | TXD2 | 6 | CTS2 |
| 7 | DTR2 | 8 | RI2 |
| 9 | GND | 10 | N.C. |

**CN1, CN2, CN3**



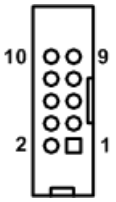

| Pin | CN2 Signal | Pin | CN2 Signal |
|---|---|---|---|
| 1 | DCD3 | 2 | DSR3 |
| 3 | RXD3 | 4 | RTS3 |
| 5 | TXD3 | 6 | CTS3 |
| 7 | DTR3 | 8 | RI3 |
| 9 | GND | 10 | N.C. |

| Pin | CN3 Signal | Pin | CN3 Signal |
|---|---|---|---|
| 1 | DCD4 | 2 | DSR4 |
| 3 | RXD4 | 4 | RTS4 |
| 5 | TXD4 | 6 | CTS4 |
| 7 | DTR4 | 8 | RI4 |
| 9 | GND | 10 | N.C. |

The CN5 (for COM5) is a 2x5 pin box header that supports RS-232 TTL signal.

| Pin | CN5 Signal | Pin | CN5 Signal |
|---|---|---|---|
| 1 | DCD | 2 | DSR |
| 3 | RXD | 4 | RTS |
| 5 | TXD | 6 | CTS |
| 7 | DTR | 8 | RI |
| 9 | GND | 10 | N.C. |

**CN5**

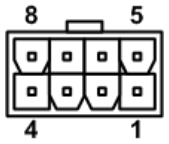


### 2.4.2 Power Connector (CN4)

Steady and sufficient power can be supplied to all components on the board by connecting power connector. Please make sure all components and devices are properly installed before connecting the power connector.

External power supply plug fits into this connector in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

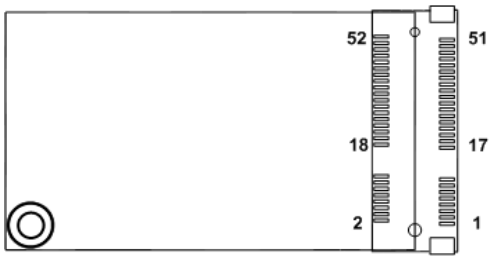
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | GND | 5 | +12V |
| 2 | GND | 6 | +12V |
| 3 | GND | 7 | +12V |
| 4 | GND | 8 | +12V |




### 2.4.3 PCI-Express Mini Card Connector (CN6)

CN6 is a PCI-Express Mini Card connector which supports a PCI-Express x1 link and a USB 2.0 link. A PCI-Express Mini Card can be applied to either PCI-Express or USB 2.0. It complies with PCI-Express Mini Card Spec. v1.2.

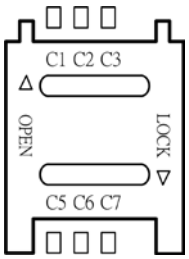
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | WAKE# | 2 | +3.3VSB |
| 3 | No use | 4 | GND |
| 5 | No use | 6 | +1.5V |
| 7 | CLKREQ# | 8 | No use |
| 9 | GND | 10 | No use |
| 11 | REFCLK- | 12 | No use |
| 13 | REFCLK+ | 14 | No use |
| 15 | GND | 16 | No use |
| 17 | No use | 18 | GND |
| 19 | No use | 20 | W_DISABLE# |
| 21 | GND | 22 | PERST# |
| 23 | PE_RXN3 | 24 | +3.3VSB |
| 25 | PE_RXP3 | 26 | GND |
| 27 | GND | 28 | +1.5V |
| 29 | GND | 30 | SMB_CLK |
| 31 | PE_TXN3 | 32 | SMB_DATA |
| 33 | PE_TXP3 | 34 | GND |
| 35 | GND | 36 | USB_D8- |
| 37 | GND | 38 | USB_D8+ |
| 39 | +3.3VSB | 40 | GND |
| 41 | +3.3VSB | 42 | LED_WWAN# |
| 43 | GND | 44 | LED_WLAN# |
| 45 | No use | 46 | LED_WPAN# |
| 47 | No use | 48 | +1.5V |
| 49 | No use | 50 | GND |
| 51 | No use | 52 | +3.3VSB |



### 2.4.4 SIM Card Slot (CN7)

The CN7 is for inserting SIM Card. In order to work properly, the SIM Card must be used together with Mini Card which is inserted to socket CN6. It is mainly used in 3G wireless network application.

| Pin | Signal |
|---|---|
| C1 | PWR |
| C2 | RST |
| C3 | CLK |
| C5 | GND |
| C6 | VPP |
| C7 | DATA |




### 2.4.5 Inverter Connector (CN8)

The CN8 is a DF13-8S-1.25V 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

| Pin | Signal |
|---|---|
| 1 | VBL1 (+12V level) |
| 2 | VBL1 (+12V level) |
| 3 | VBL2 (+5V level) |
| 4 | VBL_ENABLE |
| 5 | GND |
| 6 | GND |
| 7 | GND |
| 8 | VBL Brightness Control |

**8** **1**

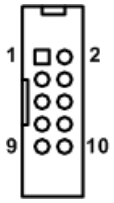
## 2.4.6 USB Connectors (CN9 and CN10)

These 2x5 pin wafers (CN9 and CN10) are Universal Serial Bus (USB) connectors. They are for installing versatile USB 2.0 compliant interface peripherals. These connectors are designed with +5V level standby power which can provide power when system is in suspend mode.

CN9 carries USB port 8 and 9 while CN10 carries USB port 6 and 7.

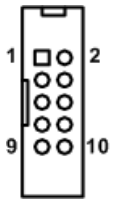
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | USB VCC (+5V level standby power) | 2 | USB VCC (+5V level standby power) |
| 3 | USB #8_D- | 4 | USB #9_D- |
| 5 | USB #8_D+ | 6 | USB #9_D+ |
| 7 | GND | 8 | GND |
| 9 | GND | 10 | GND |

CN9




| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | USB VCC (+5V level standby power) | 2 | USB VCC (+5V level standby power) |
| 3 | USB #6_D- | 4 | USB #7_D- |
| 5 | USB #6_D+ | 6 | USB #7_D+ |
| 7 | GND | 8 | GND |
| 9 | GND | 10 | GND |

CN10



## 2.4.7 LVDS Connector (CN11)

This board has a 40-pin connector (CN11) for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B 40-pin connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V level or +5V level by JP12 (see section 2.3.9).

**18-bit single channel**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | VCCM | 2 | VCCM |
| 3 | VCCM | 4 | VCCM |
| 5 | VCCM | 6 | VCCM |
| 7 | N.C. | 8 | N.C. |
| 9 | GND | 10 | GND |
| 11 | N.C. | 12 | N.C. |
| 13 | N.C. | 14 | N.C. |
| 15 | GND | 16 | GND |
| 17 | N.C. | 18 | N.C. |
| 19 | N.C. | 20 | N.C. |
| 21 | GND | 22 | GND |
| 23 | Channel A D0- | 24 | N.C. |
| 25 | Channel A D0+ | 26 | N.C. |
| 27 | GND | 28 | GND |
| 29 | Channel A D1- | 30 | N.C. |
| 31 | Channel A D1+ | 32 | N.C. |
| 33 | GND | 34 | GND |
| 35 | Channel A D2- | 36 | Channel A CLK- |
| 37 | Channel A D2+ | 38 | Channel A CLK+ |
| 39 | GND | 40 | GND |

**24-bit single channel**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | VCCM | 2 | VCCM |
| 3 | VCCM | 4 | VCCM |
| 5 | VCCM | 6 | VCCM |
| 7 | N.C. | 8 | N.C. |
| 9 | GND | 10 | GND |
| 11 | N.C. | 12 | N.C. |
| 13 | N.C. | 14 | N.C. |
| 15 | GND | 16 | GND |
| 17 | N.C. | 18 | N.C. |
| 19 | N.C. | 20 | N.C. |
| 21 | GND | 22 | GND |
| 23 | Channel A D0- | 24 | N.C. |
| 25 | Channel A D0+ | 26 | N.C. |
| 27 | GND | 28 | GND |
| 29 | Channel A D1- | 30 | Channel A D3- |
| 31 | Channel A D1+ | 32 | Channel A D3+ |
| 33 | GND | 34 | GND |
| 35 | Channel A D2- | 36 | Channel A CLK- |
| 37 | Channel A D2+ | 38 | Channel A CLK+ |
| 39 | GND | 40 | GND |

**18-bit dual channel**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | VCCM | 2 | VCCM |
| 3 | VCCM | 4 | VCCM |
| 5 | VCCM | 6 | VCCM |
| 7 | N.C. | 8 | N.C. |
| 9 | GND | 10 | GND |
| 11 | N.C. | 12 | Channel B D0- |
| 13 | N.C. | 14 | Channel B D0+ |
| 15 | GND | 16 | GND |
| 17 | Channel B CLK- | 18 | Channel B D1- |
| 19 | Channel B CLK+ | 20 | Channel B D1+ |
| 21 | GND | 22 | GND |
| 23 | Channel A D0- | 24 | Channel B D2- |
| 25 | Channel A D0+ | 26 | Channel B D2+ |
| 27 | GND | 28 | GND |
| 29 | Channel A D1- | 30 | N.C. |
| 31 | Channel A D1+ | 32 | N.C. |
| 33 | GND | 34 | GND |
| 35 | Channel A D2- | 36 | Channel A CLK- |
| 37 | Channel A D2+ | 38 | Channel A CLK+ |
| 39 | GND | 40 | GND |

**24-bit dual channel**

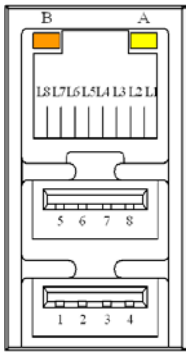
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | VCCM | 2 | VCCM |
| 3 | VCCM | 4 | VCCM |
| 5 | VCCM | 6 | VCCM |
| 7 | N.C. | 8 | N.C. |
| 9 | GND | 10 | GND |
| 11 | Channel B D3- | 12 | Channel B D0- |
| 13 | Channel B D3+ | 14 | Channel B D0+ |
| 15 | GND | 16 | GND |
| 17 | Channel B CLK- | 18 | Channel B D1- |
| 19 | Channel B CLK+ | 20 | Channel B D1+ |
| 21 | GND | 22 | GND |
| 23 | Channel A D0- | 24 | Channel B D2- |
| 25 | Channel A D0+ | 26 | Channel B D2+ |
| 27 | GND | 28 | GND |
| 29 | Channel A D1- | 30 | Channel A D3- |
| 31 | Channel A D1+ | 32 | Channel A D3+ |
| 33 | GND | 34 | GND |
| 35 | Channel A D2- | 36 | Channel A CLK- |
| 37 | Channel A D2+ | 38 | Channel A CLK+ |
| 39 | GND | 40 | GND |

## 2.4.8 LAN and USB Connector (CN12)

The upper RJ-45 connector (for LAN2) is for high performance plug and play Gigabit ethernet interface which is fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

The lower stacked USB (compliant with USB 2.0 (480Mbps)) connector is for installing USB peripherals such as keyboard, mouse, scanner, etc. Note that this connector carries USB port 4 and 5.

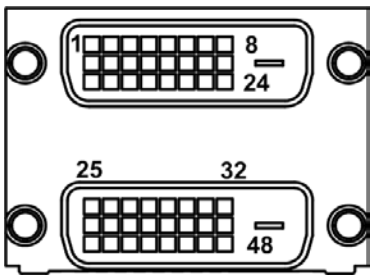
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| L1 | MDI0+ | 1 | USB_VCC (+5V level ) |
| L2 | MDI0- | 2 | USB #4_D- |
| L3 | MDI1+ | 3 | USB #4_D+ |
| L4 | MDI1- | 4 | GND |
| L5 | MDI2+ | 5 | USB VCC (+5V level) |
| L6 | MDI2- | 6 | USB #5_D- |
| L7 | MDI3+ | 7 | USB #5_D+ |
| L8 | MDI3- | 8 | GND |
| A | Active LED (Yellow) | | |
| B | 100 LAN LED (Green) / 1000 LAN LED (Orange) | | |



### 2.4.9 Dual DVI-D Connector (CN13)

The CN13 is a dual DVI-D connector for digital visual interface display.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | TMDS3_DATA2# | 25 | TMDS4_DATA2# |
| 2 | TMDS3_DATA2 | 26 | TMDS4_DATA2 |
| 3 | GND | 27 | GND |
| 4 | N.C. | 28 | N.C. |
| 5 | N.C. | 29 | N.C. |
| 6 | TMDS3_SCL | 30 | TMDS4_SCL |
| 7 | TMDS3_SDA | 31 | TMDS4_SDA |
| 8 | N.C. | 32 | N.C. |
| 9 | TMDS3_DATA1# | 33 | TMDS4_DATA1# |
| 10 | TMDS3_DATA1 | 34 | TMDS4_DATA1 |
| 11 | GND | 35 | GND |
| 12 | N.C. | 36 | N.C. |
| 13 | N.C. | 37 | N.C. |
| 14 | +5V | 38 | +5V |
| 15 | GND | 39 | GND |
| 16 | TMDS3_HDP | 40 | TMDS4_HDP |
| 17 | TMDS3_DATA0# | 41 | TMDS4_DATA0# |
| 18 | TMDS3_DATA0 | 42 | TMDS4_DATA0 |
| 19 | GND | 43 | GND |
| 20 | N.C. | 44 | N.C. |
| 21 | N.C. | 45 | N.C. |
| 22 | GND | 46 | GND |
| 23 | TMDS3_CLK | 47 | TMDS4_CLK |
| 24 | TMDS3_CLK# | 48 | TMDS4_CLK# |

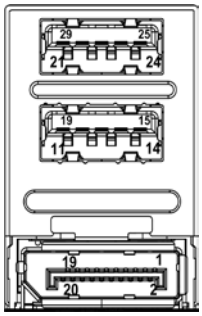


### 2.4.10 USB and DisplayPort Connectors (CN14~15 and CN18~19)

The CN14 is a high rise stacked USB connector carrying USB 3.0 (port 0 and 1) and USB 2.0 (port 10 and 11).

The lower DisplayPort 1 connector (CN18) supports DP++.

| Pin | CN14 Signal | Pin | CN14 Signal |
|---|---|---|---|
| 11 | USB VCC (+5V level) | 21 | USB VCC (+5V level) |
| 12 | USB #10_D- | 22 | USB #11_D- |
| 13 | USB #10_D+ | 23 | USB #11_D+ |
| 14 | GND | 24 | GND |
| 15 | USB0_SSRXN | 25 | USB1_SSRXN |
| 16 | USB0_SSRXP | 26 | USB1_SSRXP |
| 17 | GND | 27 | GND |
| 18 | USB0_SSTXN | 28 | USB1_SSTXN |
| 19 | USB0_SSTXP | 29 | USB1_SSTXP |




**CN14**

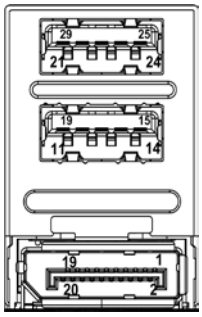
**CN18**

| Pin | CN18 Signal | Pin | CN18 Signal |
|---|---|---|---|
| 1 | DP1_LANE0 | 11 | GND |
| 2 | GND | 12 | DP1_LANE3# |
| 3 | DP1_LANE0# | 13 | Detect Pin |
| 4 | DP1_LANE1 | 14 | GND |
| 5 | GND | 15 | DP1_AUX |
| 6 | DP1_LANE1# | 16 | GND |
| 7 | DP1_LANE2 | 17 | DP1_AUX# |
| 8 | GND | 18 | DP1_HPDE |
| 9 | DP1_LANE2# | 19 | GND |
| 10 | DP1_LANE3 | 20 | +3.3V |

The CN15 is a high rise stacked USB connector carrying USB 3.0 (port 2 and 3) and USB 2.0 (port 12 and 13).

The lower DisplayPort 2 connector (CN19) supports DP++.

| Pin | CN15 Signal | Pin | CN15 Signal |
|---|---|---|---|
| 11 | USB VCC (+5V level) | 21 | USB VCC (+5V level) |
| 12 | USB #12_D- | 22 | USB #13_D- |
| 13 | USB #12_D+ | 23 | USB #13_D+ |
| 14 | GND | 24 | GND |
| 15 | USB2_SSRXN | 25 | USB3_SSRXN |
| 16 | USB2_SSRXP | 26 | USB3_SSRXP |
| 17 | GND | 27 | GND |
| 18 | USB2_SSTXN | 28 | USB3_SSTXN |
| 19 | USB2_SSTXP | 29 | USB3_SSTXP |




**CN15**

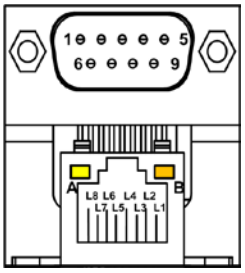
**CN19**

| Pin | CN19 Signal | Pin | CN19 Signal |
|---|---|---|---|
| 1 | DP2_LANE0 | 11 | GND |
| 2 | GND | 12 | DP2_LANE3# |
| 3 | DP2_LANE0# | 13 | Detect Pin |
| 4 | DP2_LANE1 | 14 | GND |
| 5 | GND | 15 | DP2_AUX |
| 6 | DP2_LANE1# | 16 | GND |
| 7 | DP2_LANE2 | 17 | DP2_AUX# |
| 8 | GND | 18 | DP2_HPDE |
| 9 | DP2_LANE2# | 19 | GND |
| 10 | DP2_LANE3 | 20 | +3.3V |

### 2.4.11 High Rise D-Sub and LAN Connectors (CN16 and CN20)

The CN16 is a high rise 9-pin D-Sub connector for COM1 featuring +5V level power capability on DCD and +12V level on RI by setting JP5 (see section 2.3.4). If you need COM1 port to support RS-422 or RS-485, please refer to section 2.3.10. The pin assignments of RS-232/RS-422/RS-485 are listed in table below.

| Pin | RS-232 | RS-422 | RS-485 |
|---|---|---|---|
| 1 | DCD | TX- | Data- |
| 2 | RXD | TX+ | Data+ |
| 3 | TXD | RX+ | N.C |
| 4 | DTR | RX- | N.C. |
| 5 | GND | No use | No use |
| 6 | DSR | No use | No use |
| 7 | RTS | No use | No use |
| 8 | CTS | No use | No use |
| 9 | RI | No use | No use |




**CN16**

**CN20**

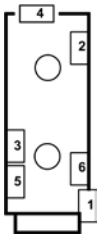
The lower CN20 is a RJ-45 connector for LAN1 featuring high performance plug and play Gigabit ethernet interface which is fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| L1 | MDI0+ | L5 | MDI2+ |
| L2 | MDI0- | L6 | MDI2- |
| L3 | MDI1+ | L7 | MDI3+ |
| L4 | MDI1- | L8 | MDI3- |
| A | Active LED (Yellow) | | |
| B | 100 LAN LED (Green) / 1000 LAN LED (Orange) | | |

### 2.4.12 Six Terminal Earphone Jack (CN17)

The CN17 supports 2.1 channel audio line-out.

| Pin | Signal |
|---|---|
| 1 | AUDIO_GND |
| 2 | LEF |
| 3 | Line out_L |
| 4 | LEF_SENSE |
| 5 | Line out_SENSE |
| 6 | Line out_R |

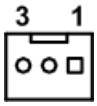


## 2.4.13 FAN Connectors (FAN1, FAN2 and FAN3)

Fans are always needed for cooling down CPU and system temperature. The board has three fan connectors. You can find fan speed option(s) at BIOS Setup Utility if either fan is installed. For further information, see BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

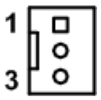
System fan interface is available through FAN1, see table below.

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V level |
| 3 | Fan speed feedback |



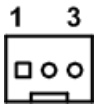

The FAN2 is a standard 3-pin 2.54mm fan connector.

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V level |
| 3 | +5V level |




CPU fan interface is available through FAN3, see table below.

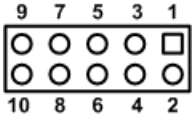
| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V level |
| 3 | Fan speed feedback |




## 2.4.14 Digital I/O Connector (JP1)

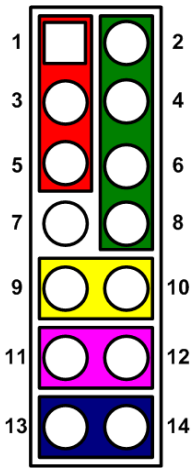
The board is equipped with an 8-channel (4 inputs and 4 outputs) digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals. The software application method is provided in Appendix B.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Digital Input 0 | 2 | Digital Output 0 |
| 3 | Digital Input 1 | 4 | Digital Output 1 |
| 5 | Digital Input 2 | 6 | Digital Output 2 |
| 7 | Digital Input 3 | 8 | Digital Output 3 |
| 9 | GND | 10 | GND |



### 2.4.15 Front Panel Connector (JP8)

| Pin | Signal |
|---|---|
| 1 | PWRLED+ |
| 2 | EXT SPK- |
| 3 | N.C. |
| 4 | Buzzer |
| 5 | PWRLED- |
| 6 | N.C. |
| 7 | N.C. |
| 8 | EXT SPK+ |
| 9 | PWRSW- |
| 10 | PWRSW+ |
| 11 | HW RST- |
| 12 | HW RST+ |
| 13 | HDDLED- |
| 14 | HDDLED+ |




**Power LED**
Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on. The pin 3 is defined as GND.

**External Speaker and Internal Buzzer**
Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

**Power On/Off Button**
Pin 9 and 10 connect the power button on front panel to the CPU board, which allows users to turn on or off power supply.

**System Reset Switch**
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

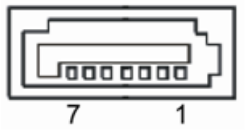
**HDD Activity LED**
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

### 2.4.16 Serial ATA Connectors (SATA1, SATA2, SATA3 and SATA4)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives.

This board has four SATA 3.0 ports featuring 6Gb/s performance.

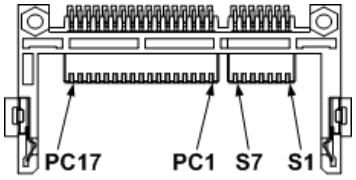
| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | SATA_TX+ |
| 3 | SATA_TX- |
| 4 | GND |
| 5 | SATA_RX- |
| 6 | SATA_RX+ |
| 7 | GND |




### 2.4.17 CFast™ Socket (SCN1)

The board is equipped with a CFast™ socket on the bottom side to support CFast™ card which is based on Serial ATA bus. This socket is specially designed to avoid incorrect installation of CFast™ card. When installing or removing CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| S1 | GND | PC1 | N.C |
| S2 | TX+ | PC2 | GND |
| S3 | TX- | PC3 | N.C |
| S4 | GND | PC4 | N.C |
| S5 | RX+ | PC5 | N.C |
| S6 | RX- | PC6 | N.C |
| S7 | GND | PC7 | GND |
| | | PC8 | N.C |
| | | PC9 | N.C |
| | | PC10 | N.C |
| | | PC11 | N.C |
| | | PC12 | N.C |
| | | PC13 | +3.3V level |
| | | PC14 | +3.3V level |
| | | PC15 | GND |
| | | PC16 | GND |
| | | PC17 | N.C |



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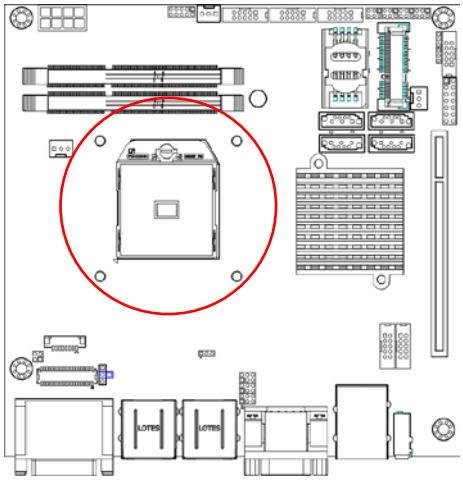
# Chapter 3
# Hardware Installation

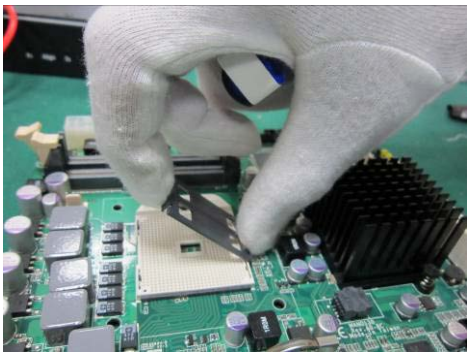
## 3.1 Installing the Processor

Please install the processor step by step as below:

**1.** Locate the processor socket on the board.



**2.** The onboard processor socket comes with protective plastic cover. Remove the cover only when you want to install a processor. Do not discard the protective cover. Remember always replace the cover on the socket when the processor is not in the socket.

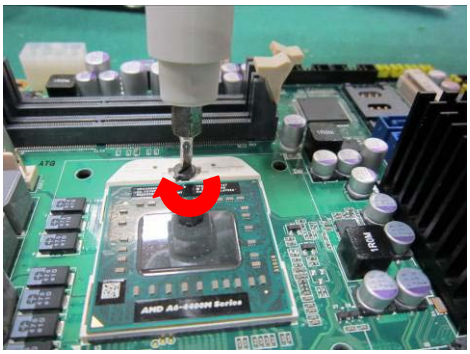


**3.** Grasp the processor carefully by the edges and place it into the socket vertically. Please ensure that the processor is oriented correctly (see image below).

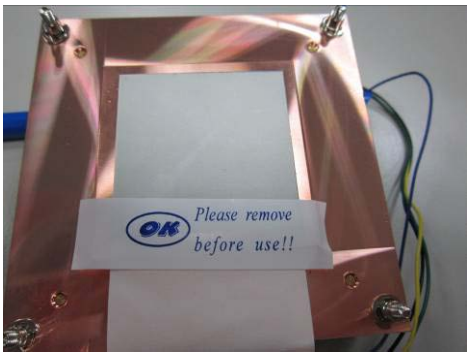
**Caution**

***The processor fits in only one correct orientation. DO NOT force the processor into the socket to prevent bending the landing pins in the socket and damaging the processor!***

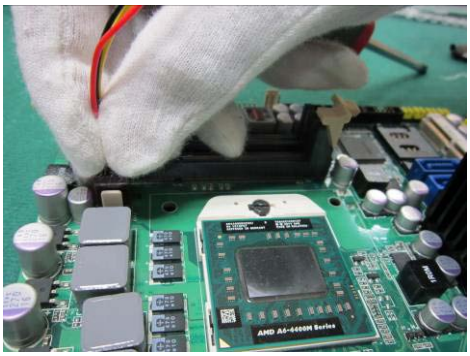
**4.** Turn the processor lock into the correct locking orientation as illustrated below.



**5.** Remove protective cover from the heatsink.



**6.** Make sure the CPU fan cable is plugged to CPU fan connector.



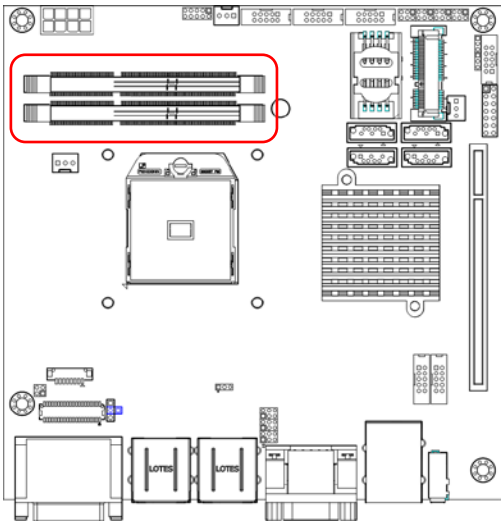
**7.** Place heatsink and CPU fan assembly on top of the installed processor. Match the four screws to the fixing holes on the board. Then screw tightly the heatsink and CPU fan assembly onto the board.

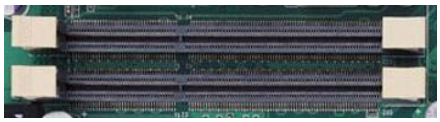
**Caution**

***Be careful not to over tighten the screws as it can damage the processor or the motherboard.***

## 3.2 Installing the Memory

The board comes with two 204-pin DDR3 SO-DIMM memory sockets with maximum memory capacity up to 16GB. The following image illustrates the location of the sockets:





**DIMM1**

**DIMM2**

**Note**

***A DDR3 module has the same physical dimensions as a DDR2 SO-DIMM but is notched differently to prevent installation on a DDR2 SO-DIMM socket.***

Please follow steps below to install the memory modules:

- Push down latches on each side of the SO-DIMM socket.
- Align the memory module with the socket that notches of memory module must match the socket keys for a correct installation.
- Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the SO-DIMM.
- Install any remaining SO-DIMM modules.

# Chapter 4
# Hardware Description

## 4.1 APU (Accelerated Processing Unit)

The MANO111 Series supports AMD R-Series APU (Accelerated Processing Unit), which enables your system to operate under Windows® XP, Windows® 7 and Linux environments. The system performance depends on the APU.

## 4.2 BIOS

The MANO111 Series uses AMI Plug and Play BIOS with a single 32Mbit SPI Flash.

## 4.3 System Memory

The MANO111 Series supports two 204-pin DDR3 SO-DIMM sockets for a maximum memory of 16GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB and 4GB.

## 4.4 I/O Port Address Map

The AMD G-Series APU communicates via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

**Input/output (IO)**

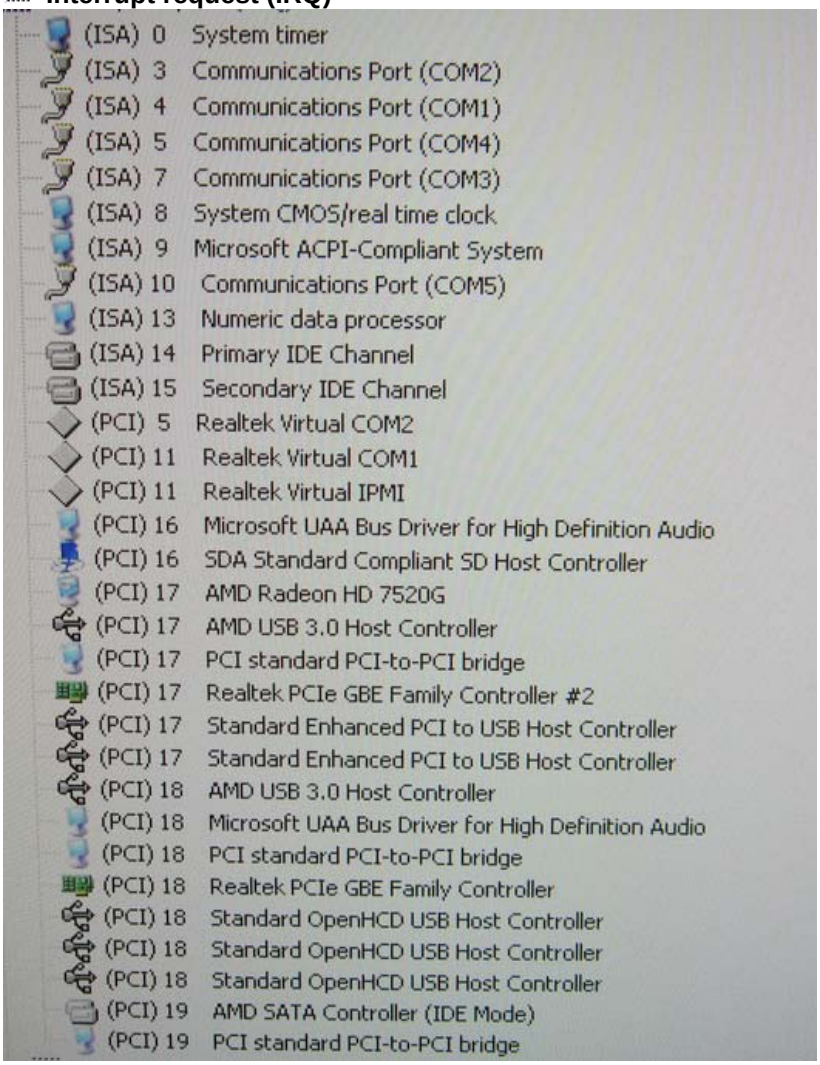
- [00000000 – 0000000F] Direct memory access controller
- [00000000 – 0000000F] Motherboard resources
- [00000000 – 000003AF] PCI bus
- [00000010 – 0000001F] Motherboard resources
- [00000010 – 0000001F] Motherboard resources
- [00000020 – 00000021] Programmable interrupt controller
- [00000022 – 0000003F] Motherboard resources
- [00000022 – 0000003F] Motherboard resources
- [00000040 – 00000043] System timer
- [00000044 – 0000005F] Motherboard resources
- [00000061 – 00000061] System speaker
- [00000063 – 00000063] Motherboard resources
- [00000065 – 00000065] Motherboard resources
- [00000067 – 0000006F] Motherboard resources
- [00000070 – 00000071] System CMOS/real time clock
- [00000072 – 0000007F] Motherboard resources
- [00000072 – 0000007F] Motherboard resources
- [00000080 – 00000080] Motherboard resources
- [00000080 – 00000080] Motherboard resources
- [00000081 – 00000083] Direct memory access controller
- [00000084 – 00000086] Motherboard resources
- [00000084 – 00000086] Motherboard resources
- [00000087 – 00000087] Direct memory access controller
- [00000088 – 00000088] Motherboard resources
- [00000088 – 00000088] Motherboard resources
- [00000089 – 0000008B] Direct memory access controller
- [0000008C – 0000008E] Motherboard resources
- [0000008C – 0000008E] Motherboard resources
- [0000008F – 0000008F] Direct memory access controller
- [00000090 – 0000009F] Motherboard resources
- [00000090 – 0000009F] Motherboard resources
- [000000A0 – 000000A1] Programmable interrupt controller
- [000000A2 – 000000BF] Motherboard resources
- [000000A2 – 000000BF] Motherboard resources
- [000000B1 – 000000B1] Motherboard resources
- [000000C0 – 000000DF] Direct memory access controller
- [000000E0 – 000000EF] Motherboard resources
- [000000E0 – 000000EF] Motherboard resources
- [000000F0 – 000000FF] Numeric data processor
- [00000170 – 00000177] Secondary IDE Channel
- [000001F0 – 000001F7] Primary IDE Channel
- [00000274 – 00000277] ISAPNP Read Data Port
- [00000279 – 00000279] ISAPNP Read Data Port
- [00000290 – 00000297] Motherboard resources
- [000002E0 – 000002E7] Communications Port (COM5)

- [000002F8 – 000002FF] Communications Port (COM2)
- [00000376 – 00000376] Secondary IDE Channel
- [000003B0 – 000003BB] AMD Radeon HD 7520G
- [000003B0 – 000003DF] PCI bus
- [000003C0 – 000003DF] AMD Radeon HD 7520G
- [000003E0 – 00000CF7] PCI bus
- [000003E8 – 000003EF] Communications Port (COM3)
- [000003F6 – 000003F6] Primary IDE Channel
- [000003F8 – 000003FF] Communications Port (COM1)
- [0000040B – 0000040B] Motherboard resources
- [000004D0 – 000004D1] Motherboard resources
- [000004D0 – 000004D1] Motherboard resources
- [000004D6 – 000004D6] Motherboard resources
- [00000800 – 0000089F] Motherboard resources
- [00000900 – 0000090F] Motherboard resources
- [00000910 – 0000091F] Motherboard resources
- [00000A79 – 00000A79] ISAPNP Read Data Port
- [00000B20 – 00000B3F] Motherboard resources
- [00000C00 – 00000C01] Motherboard resources
- [00000C14 – 00000C14] Motherboard resources
- [00000C50 – 00000C51] Motherboard resources
- [00000C52 – 00000C52] Motherboard resources
- [00000C6C – 00000C6C] Motherboard resources
- [00000C6F – 00000C6F] Motherboard resources
- [00000CD0 – 00000CD1] Motherboard resources
- [00000CD2 – 00000CD3] Motherboard resources
- [00000CD4 – 00000CD5] Motherboard resources
- [00000CD6 – 00000CD7] Motherboard resources
- [00000CD8 – 00000CDF] Motherboard resources
- [00000D00 – 0000FFFF] PCI bus
- [0000D000 – 0000D0FF] Realtek Virtual IPMI
- [0000D000 – 0000DFFF] PCI standard PCI-to-PCI bridge
- [0000D100 – 0000D1FF] Realtek Virtual COM2
- [0000D200 – 0000D2FF] Realtek Virtual COM1
- [0000D300 – 0000D3FF] Realtek PCIe GBE Family Controller
- [0000E000 – 0000E0FF] Realtek PCIe GBE Family Controller #2
- [0000E000 – 0000EFFF] PCI standard PCI-to-PCI bridge
- [0000F000 – 0000F0FF] AMD Radeon HD 7520G
- [0000F100 – 0000F10F] AMD PCI IDE Controller
- [0000F150 – 0000F15F] AMD SATA Controller (IDE Mode)
- [0000F160 – 0000F163] AMD SATA Controller (IDE Mode)
- [0000F170 – 0000F177] AMD SATA Controller (IDE Mode)
- [0000F180 – 0000F183] AMD SATA Controller (IDE Mode)
- [0000F190 – 0000F197] AMD SATA Controller (IDE Mode)
- [0000FE00 – 0000FEFE] Motherboard resources

## 4.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

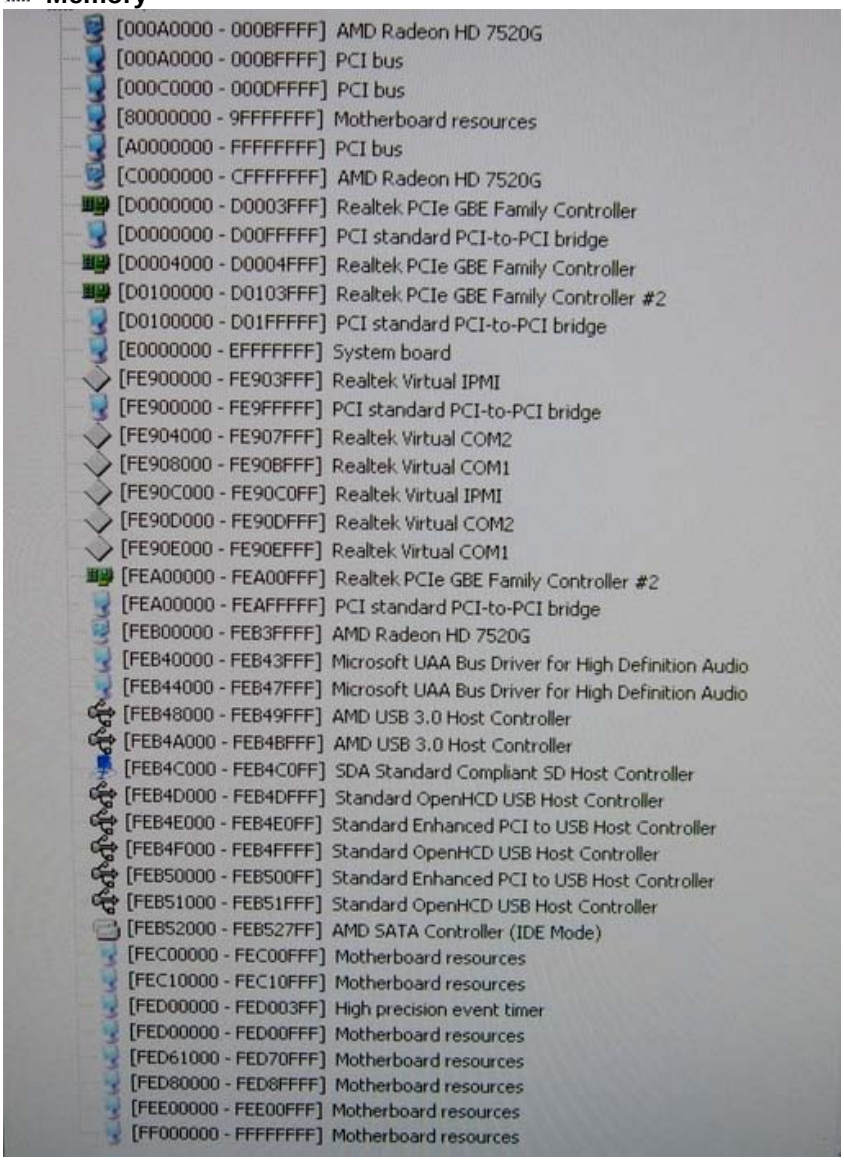
**Interrupt request (IRQ)**


(ISA) 0 System timer
(ISA) 3 Communications Port (COM2)
(ISA) 4 Communications Port (COM1)
(ISA) 5 Communications Port (COM4)
(ISA) 7 Communications Port (COM3)
(ISA) 8 System CMOS/real time clock
(ISA) 9 Microsoft ACPI-Compliant System
(ISA) 10 Communications Port (COM5)
(ISA) 13 Numeric data processor
(ISA) 14 Primary IDE Channel
(ISA) 15 Secondary IDE Channel
(PCI) 5 Realtek Virtual COM2
(PCI) 11 Realtek Virtual COM1
(PCI) 11 Realtek Virtual IPMI
(PCI) 16 Microsoft UAA Bus Driver for High Definition Audio
(PCI) 16 SDA Standard Compliant SD Host Controller
(PCI) 17 AMD Radeon HD 7520G
(PCI) 17 AMD USB 3.0 Host Controller
(PCI) 17 PCI standard PCI-to-PCI bridge
(PCI) 17 Realtek PCIe GBE Family Controller #2
(PCI) 17 Standard Enhanced PCI to USB Host Controller
(PCI) 17 Standard Enhanced PCI to USB Host Controller
(PCI) 18 AMD USB 3.0 Host Controller
(PCI) 18 Microsoft UAA Bus Driver for High Definition Audio
(PCI) 18 PCI standard PCI-to-PCI bridge
(PCI) 18 Realtek PCIe GBE Family Controller
(PCI) 18 Standard OpenHCD USB Host Controller
(PCI) 18 Standard OpenHCD USB Host Controller
(PCI) 18 Standard OpenHCD USB Host Controller
(PCI) 19 AMD SATA Controller (IDE Mode)
(PCI) 19 PCI standard PCI-to-PCI bridge

## 4.6 Memory Map

The memory mapping list is shown as follows:

**Memory**


[000A0000 - 000BFFFF] AMD Radeon HD 7520G
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[80000000 - 9FFFFFFF] Motherboard resources
[A0000000 - FFFFFFFF] PCI bus
[C0000000 - CFFFFFFF] AMD Radeon HD 7520G
[D0000000 - D0003FFF] Realtek PCIe GBE Family Controller
[D0000000 - D00FFFFF] PCI standard PCI-to-PCI bridge
[D0004000 - D0004FFF] Realtek PCIe GBE Family Controller
[D0100000 - D0103FFF] Realtek PCIe GBE Family Controller #2
[D0100000 - D01FFFFF] PCI standard PCI-to-PCI bridge
[E0000000 - EFFFFFFF] System board
[FE900000 - FE903FFF] Realtek Virtual IPMI
[FE900000 - FE9FFFFF] PCI standard PCI-to-PCI bridge
[FE904000 - FE907FFF] Realtek Virtual COM2
[FE908000 - FE90BFFF] Realtek Virtual COM1
[FE90C000 - FE90C0FF] Realtek Virtual IPMI
[FE90D000 - FE90DFFF] Realtek Virtual COM2
[FE90E000 - FE90EFFF] Realtek Virtual COM1
[FEA00000 - FEA00FFF] Realtek PCIe GBE Family Controller #2
[FEA00000 - FEAFFFFF] PCI standard PCI-to-PCI bridge
[FEB00000 - FEB3FFFF] AMD Radeon HD 7520G
[FEB40000 - FEB43FFF] Microsoft UAA Bus Driver for High Definition Audio
[FEB44000 - FEB47FFF] Microsoft UAA Bus Driver for High Definition Audio
[FEB48000 - FEB49FFF] AMD USB 3.0 Host Controller
[FEB4A000 - FEB4BFFF] AMD USB 3.0 Host Controller
[FEB4C000 - FEB4C0FF] SDA Standard Compliant SD Host Controller
[FEB4D000 - FEB4DFFF] Standard OpenHCD USB Host Controller
[FEB4E000 - FEB4E0FF] Standard Enhanced PCI to USB Host Controller
[FEB4F000 - FEB4FFFF] Standard OpenHCD USB Host Controller
[FEB50000 - FEB500FF] Standard Enhanced PCI to USB Host Controller
[FEB51000 - FEB51FFF] Standard OpenHCD USB Host Controller
[FEB52000 - FEB527FF] AMD SATA Controller (IDE Mode)
[FEC00000 - FEC00FFF] Motherboard resources
[FEC10000 - FEC10FFF] Motherboard resources
[FED00000 - FED003FF] High precision event timer
[FED00000 - FED00FFF] Motherboard resources
[FED61000 - FED70FFF] Motherboard resources
[FED80000 - FED8FFFF] Motherboard resources
[FEE00000 - FEE00FFF] Motherboard resources
[FF000000 - FFFFFFFF] Motherboard resources

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# Chapter 5
# AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

## 5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

**Note**

***If your computer can not boot after making and saving system changes with Setup, you can restore BIOS optimal defaults by setting JP10 (see section 2.3.7).***

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

## 5.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

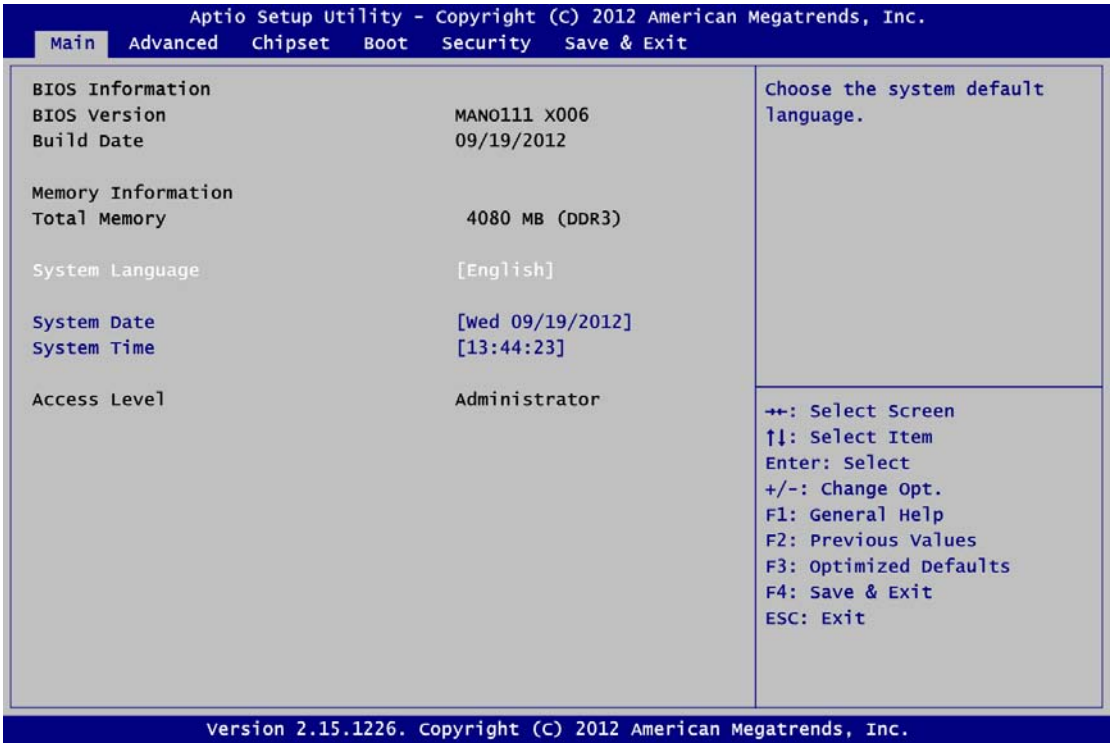
**Note**

***Some of the navigation keys differ from one screen to another.***

| Hot Keys | Description |
|---|---|
| →← Left/Right | The Left and Right <Arrow> keys allow you to select a setup screen. |
| ↑↓ Up/Down | The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen. |
| +– Plus/Minus | The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item. |
| Tab | The <Tab> key allows you to select setup fields. |
| F1 | The <F1> key allows you to display the General Help screen. |
| F2 | The <F2> key allows you to Load Previous Values. |
| F3 | The <F3> key allows you to Load Optimized Defaults. |
| F4 | The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes. |
| Esc | The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes. |
| Enter | The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens. |

## 5.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



**System Language**
Use this item to choose the system default language.

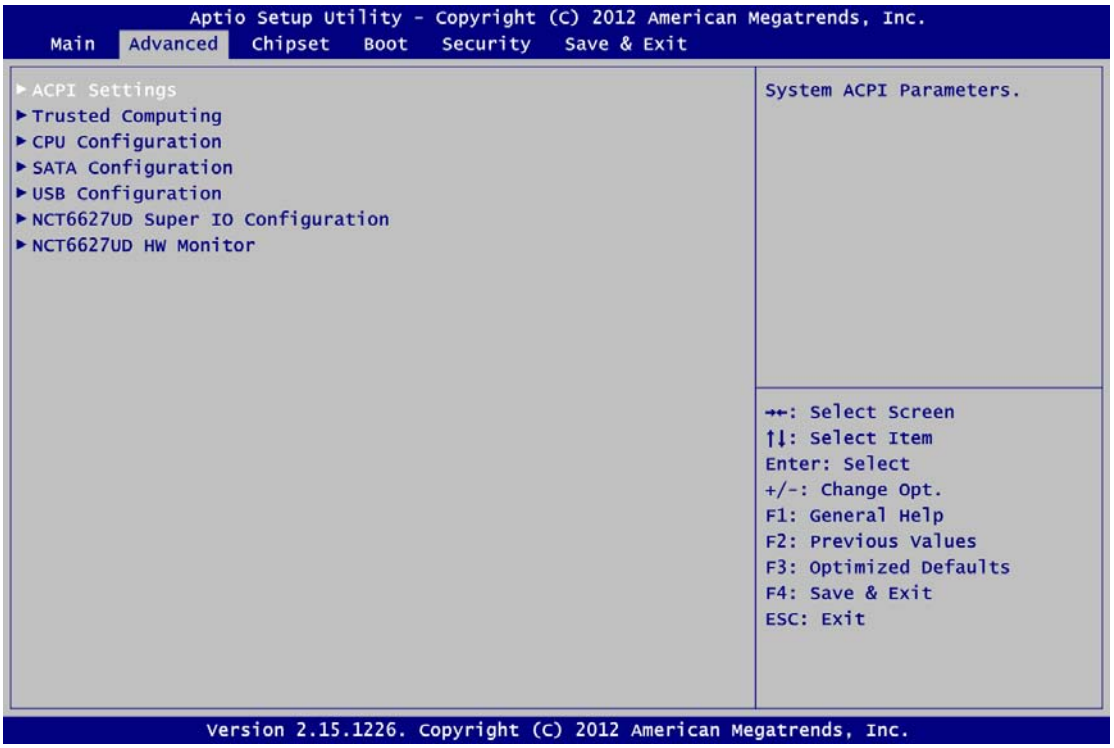
**System Date/Time**
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

## 5.4 Advanced Menu

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► ACPI Settings
- ► Trusted Computing
- ► CPU Configuration
- ► SATA Configuration
- ► USB Configuration
- ► NCT6627UD Super IO Configuration
- ► NCT6627UD HW Monitor

For items marked with "►", please press <Enter> for more options.

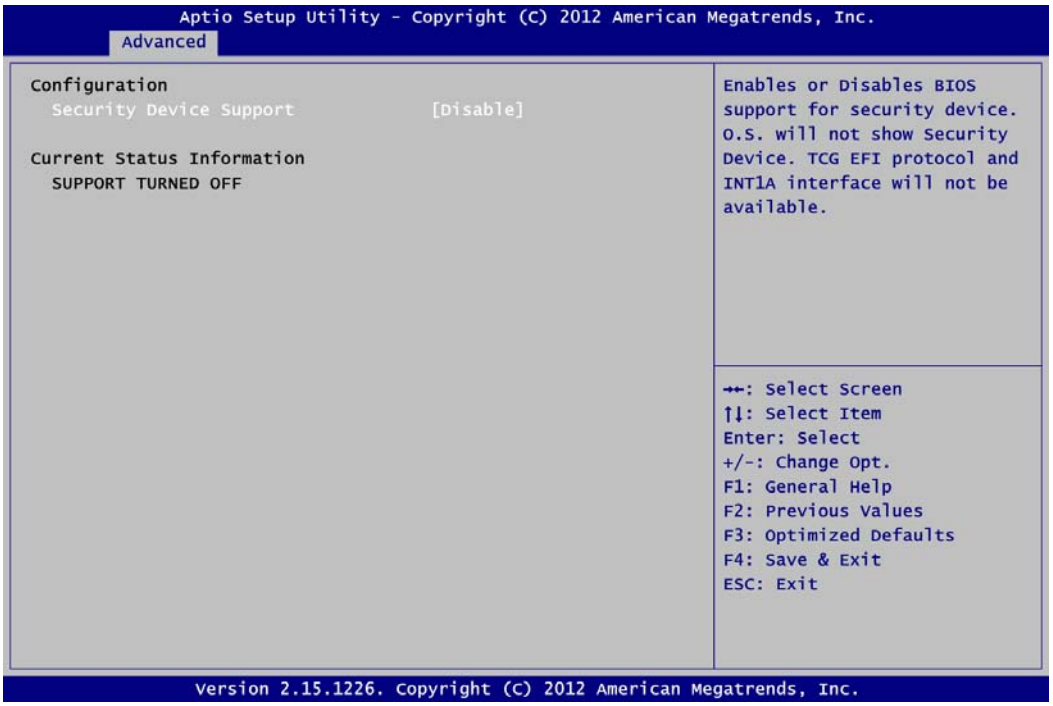


- **ACPI Settings**
  You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State
[S3 only(Suspend to ...]
Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

**ACPI Sleep State**
Select the highest ACPI sleep state the system will enter when the suspend button is pressed. Configuration options are Suspend Disabled, S1 only (CPU Stop Clock), and S3 only (Suspend to RAM).

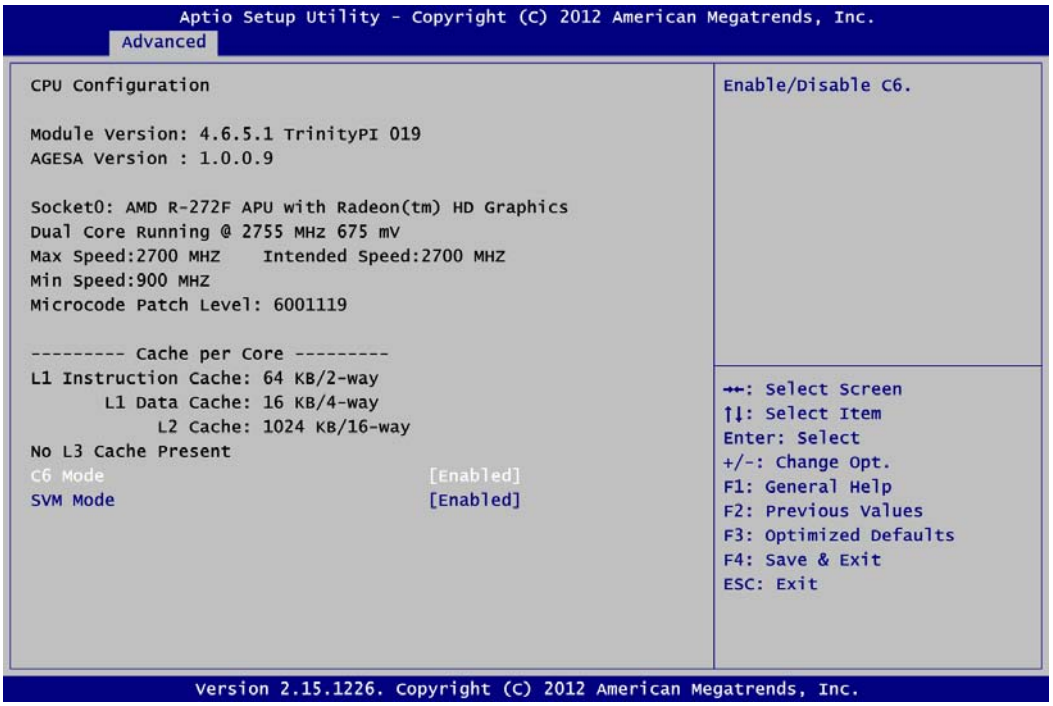
- **Trusted Computing**
  This screen provides function for specifying the TPM settings.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
Security Device Support [Disable]
Current Status Information
SUPPORT TURNED OFF
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

**Security Device Support**
Use this item to enable or disable BIOS support for security device.

**Current Status Information**
Display current TPM status information.

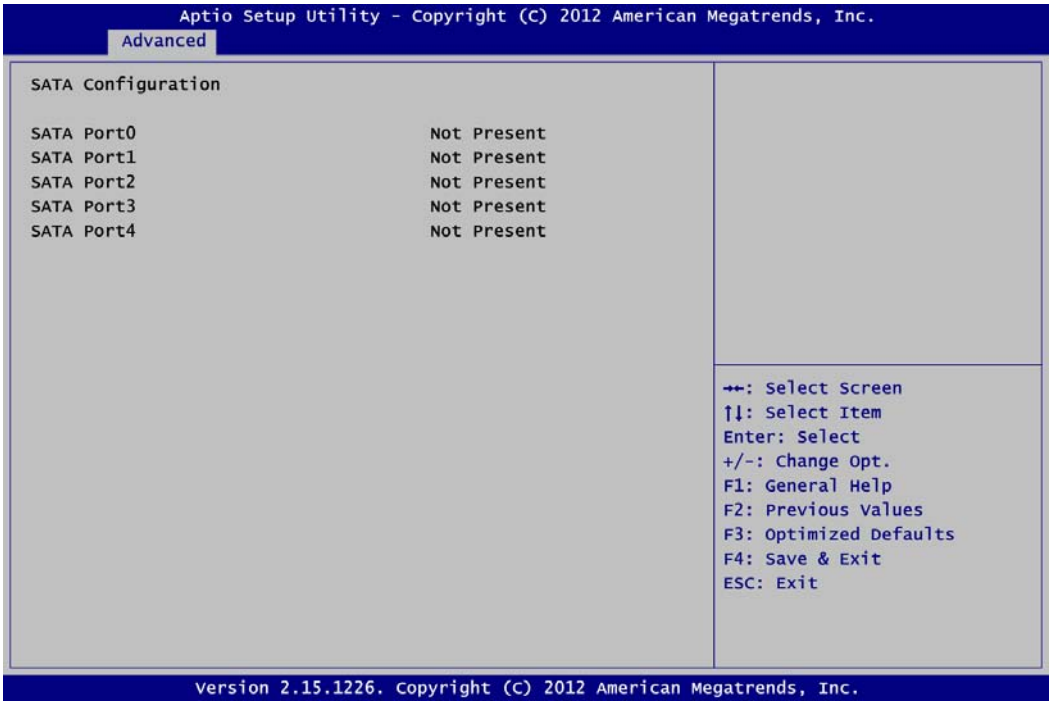
- **CPU Configuration**
  This screen shows the CPU information.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
CPU Configuration
Module Version: 4.6.5.1 TrinityPI 019
AGESA Version : 1.0.0.9
Socket0: AMD R-272F APU with Radeon(tm) HD Graphics
Dual Core Running @ 2755 MHz 675 mV
Max Speed:2700 MHZ Intended Speed:2700 MHZ
Min Speed:900 MHZ
Microcode Patch Level: 6001119
--------- Cache per Core ---------
L1 Instruction Cache: 64 KB/2-way
L1 Data Cache: 16 KB/4-way
L2 Cache: 1024 KB/16-way
No L3 Cache Present
C6 Mode [Enabled]
SVM Mode [Enabled]
Enable/Disable C6.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

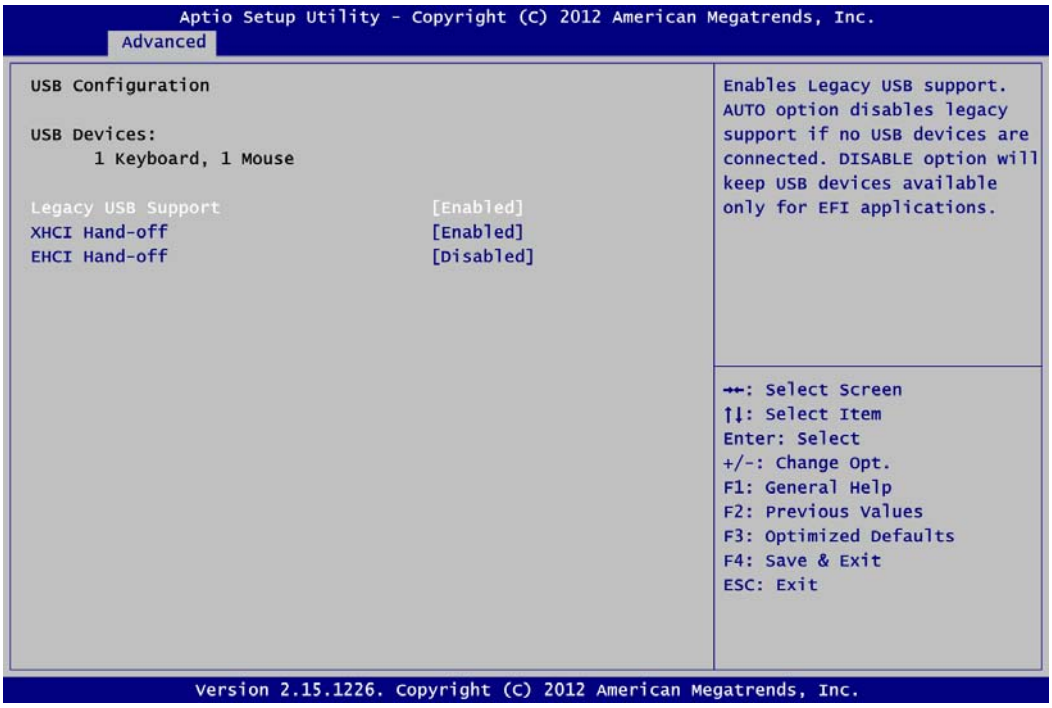
**C6 Mode**
Enable or disable C6 mode.

**SVM Mode**
Enable or disable the CPU virtualization.

- **SATA Configuration**
  In this Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.



- **USB Configuration**
  You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices:
1 Keyboard, 1 Mouse
Legacy USB Support [Enabled]
XHCI Hand-off [Enabled]
EHCI Hand-off [Disabled]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

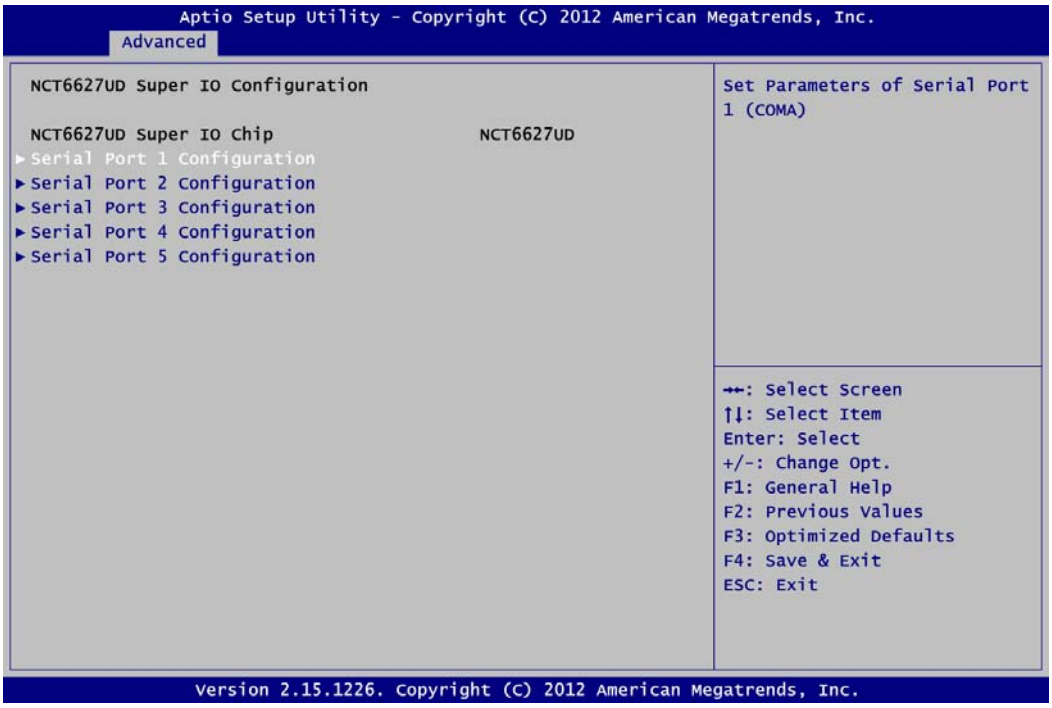
**USB Devices**
Display all detected USB devices.

**Legacy USB Support**
Use this item to enable or disable support for USB device on legacy operating system. The default setting is Enabled. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

**XHCI Hand-off**
Enable or disable support for OSes without an XHCI hand-off feature.

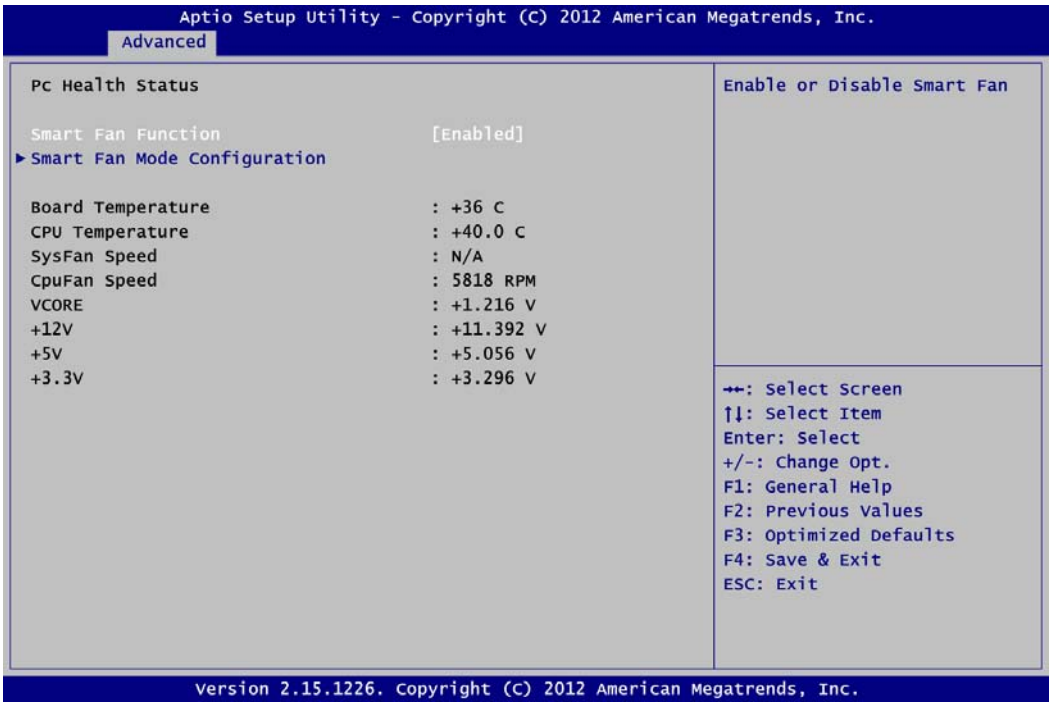
**EHCI Hand-off**
Enable or disable support for OSes without an EHCI hand-off feature.

- **NCT6627UD Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
NCT6627UD Super IO Configuration
NCT6627UD Super IO Chip NCT6627UD
► Serial Port 1 Configuration
► Serial Port 2 Configuration
► Serial Port 3 Configuration
► Serial Port 4 Configuration
► Serial Port 5 Configuration
Set Parameters of Serial Port 1 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

**Serial Port 1~5 Configuration**
Use this item to set parameters of serial port 1 to 5.

- **NCT6627UD HW Monitor**
  Use this screen for Smart Fan configuration and hardware health status monitoring.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Pc Health Status
Smart Fan Function [Enabled]
Smart Fan Mode Configuration
Board Temperature : +36 C
CPU Temperature : +40.0 C
SysFan Speed : N/A
CpuFan Speed : 5818 RPM
VCORE : +1.216 V
+12V : +11.392 V
+5V : +5.056 V
+3.3V : +3.296 V
Enable or Disable Smart Fan
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

This screen displays the temperature of system and CPU, cooling fan speed in RPM and system voltages (VCORE, +12V, +5V and +3.3V).

**Smart Fan Function**
Enable or disable Smart Fan function.

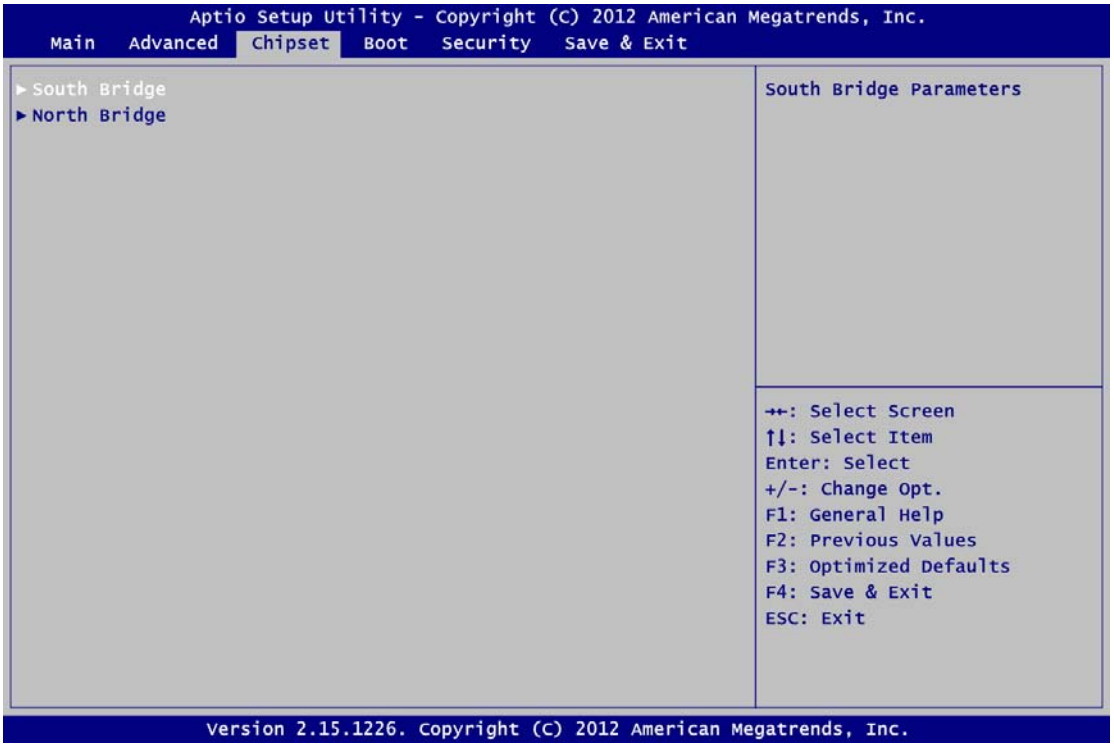
**Smart Fan Mode Configuration**
This option is for Smart Fan mode configuration.

## 5.5 Chipset Menu

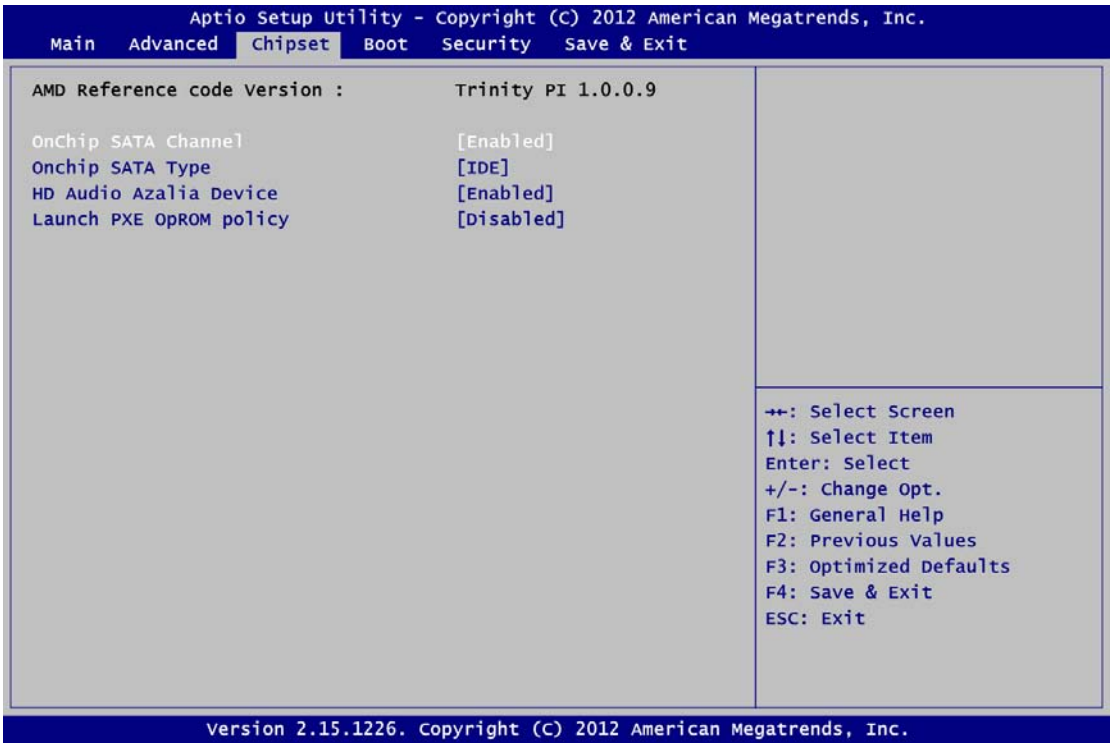
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► South Bridge
- ► North Bridge

For items marked with "►", please press <Enter> for more options.



- **South Bridge**
  This screen allows users to configure parameters of South Bridge chipset.



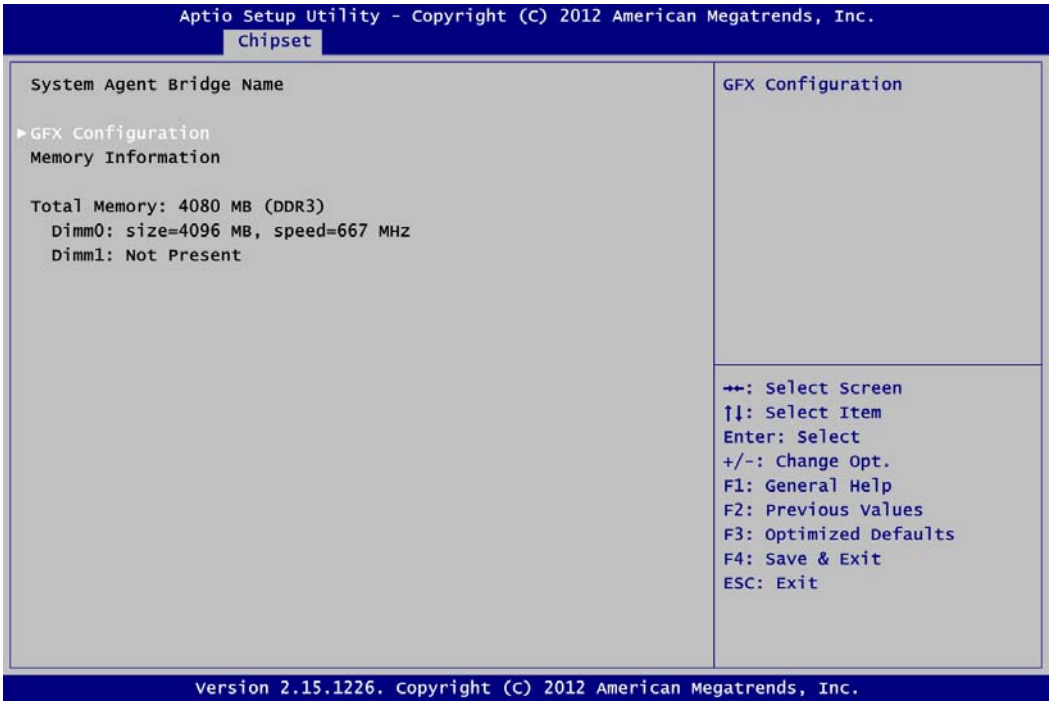

**OnChip SATA Channel**
Enable or disable SATA channel.

**OnChip SATA Type**
Here are the options: Native IDE and AHCI.

**HD Audio Azalia Device**
Enable or disable HD audio Azalia device.

**Launch PXE OpROM policy**
Control the execution of UEFI and Legacy PXE OpROM.

- **North Bridge**
  This screen allows users to configure parameters of North Bridge chipset. For items marked with "►", please press <Enter> for more options.

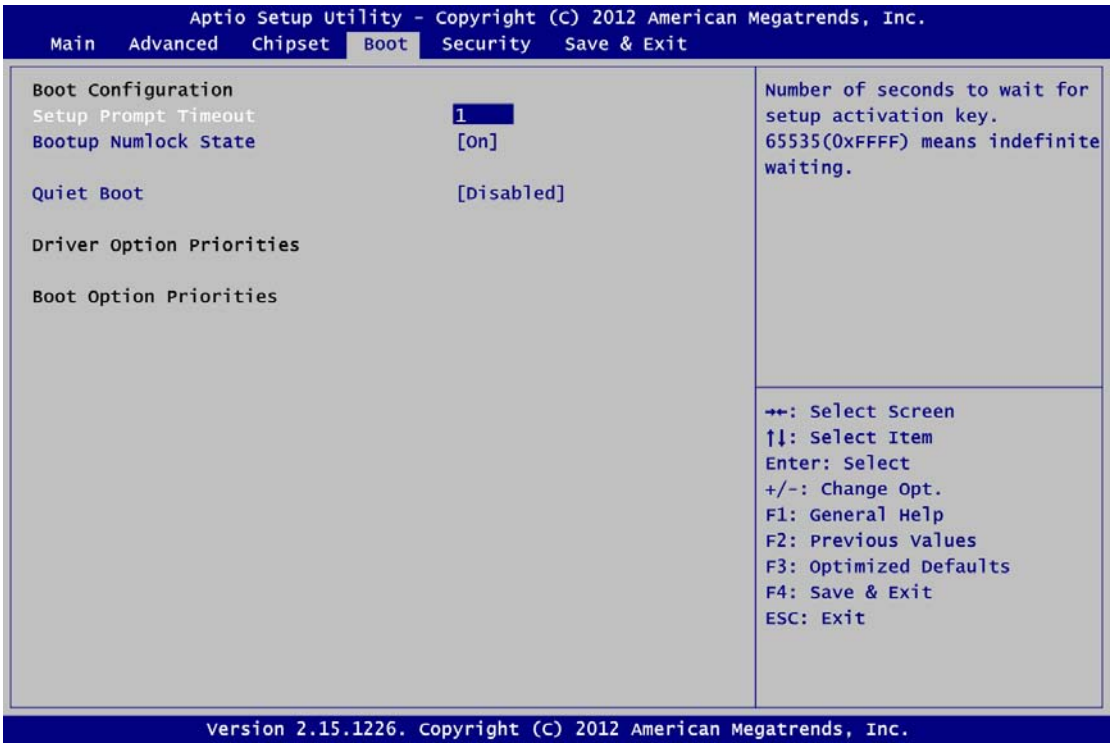



**GFX Configuration**
This option allows users to set GFX Configuration.

**Memory Information**
Display system memory information.

## 5.6 Boot Menu

The Boot menu allows users to change boot options of the system.




- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

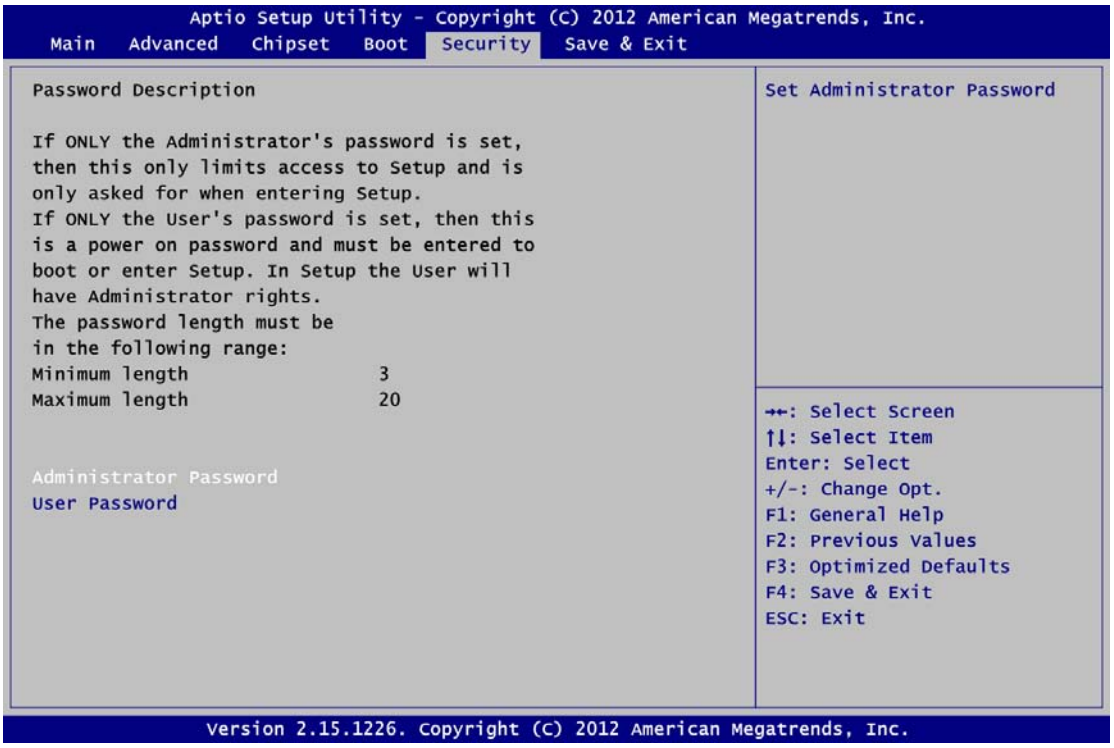
- **Bootup NumLock State**
  Use this item to select the power-on state for the keyboard NumLock.

- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

## 5.7 Security Menu

The Security menu allows users to change the security settings for the system.

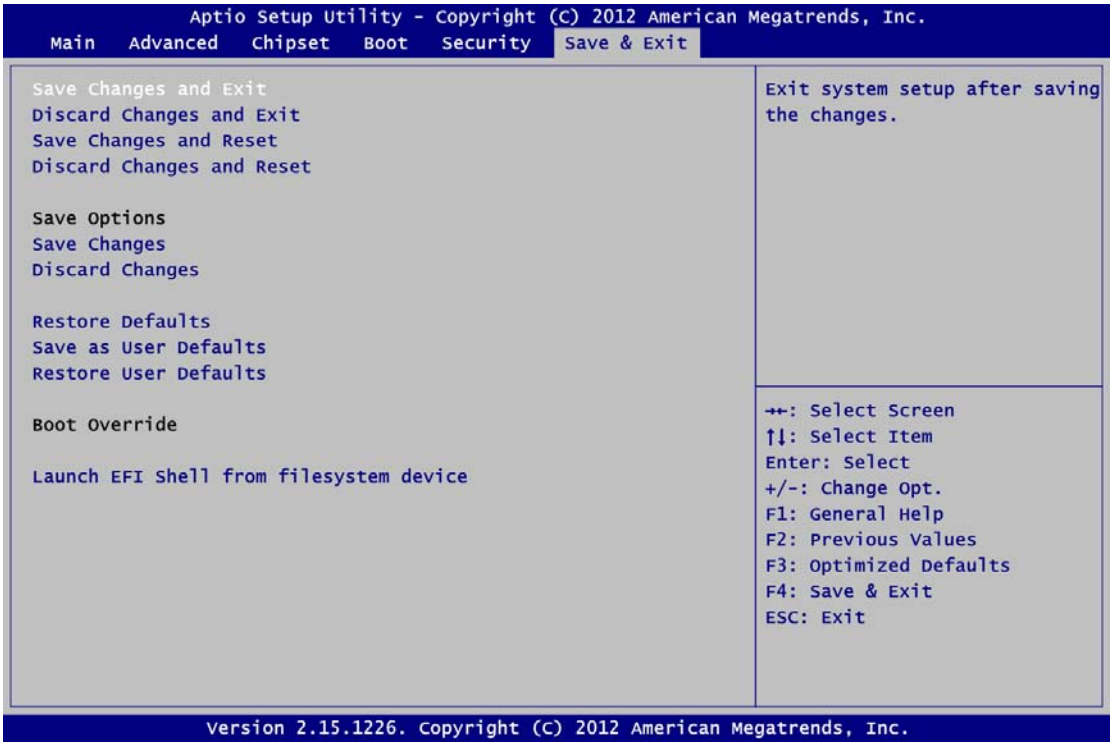

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.

- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

## 5.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.




- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

- **Launch EFI Shell from filesystem device**
  Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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# Appendix A
# Watchdog Timer

## About Watchdog Timer

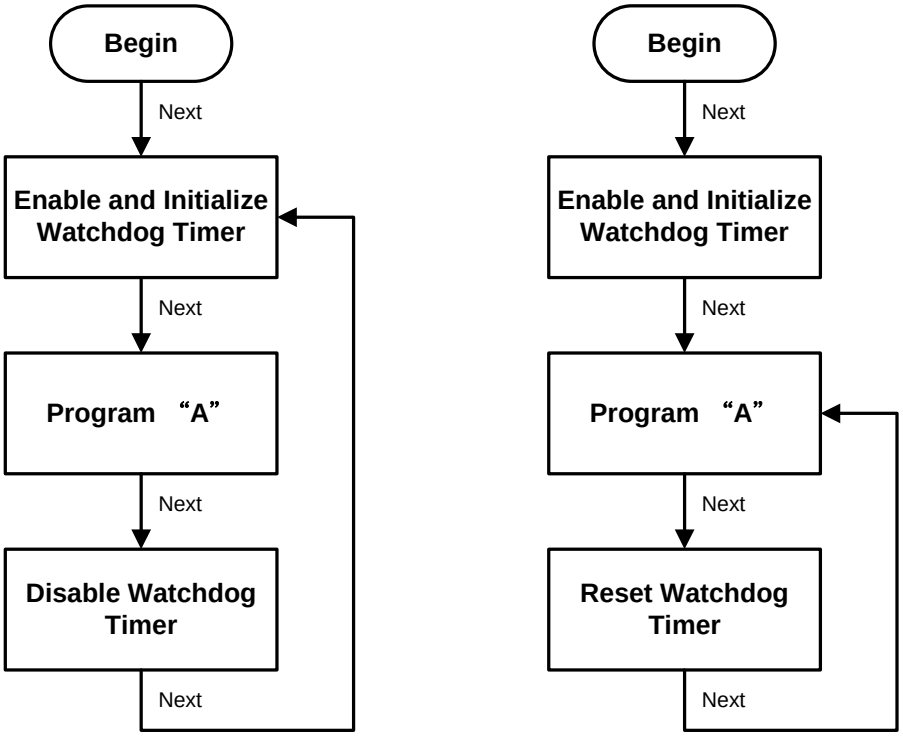
Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot. The integrated watchdog timer can be set up by programming. There are 1~255 levels available.

## How to Use Watchdog Timer

Assume that program A needs to keep running in a system. The value of watchdog timer must be set bigger than the running time of program A. Then, after the running time of program A is finished, either to disable or to reset watchdog timer.

When program A has problems that cause system shut down, the system can be rebooted by watchdog timer when the value of watchdog timer has counted down to 0.



## Sample Program

Assembly sample code :

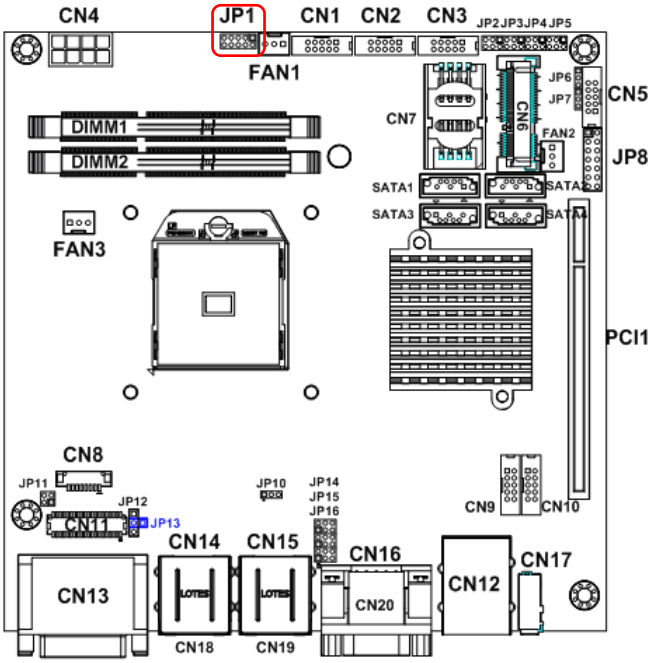
```
;Enable WDT:
mov     dx,2Eh
mov     al,87h           ;Un-lock super I/O
out     dx,al
out     dx,al

;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,08h
out     dx,al


;Select WDT function:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Set Second or Minute :
mov     dx,2Eh
mov     al,F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh            ;N=00h or 08h(see below  Note)
out     dx,al

;Set base timer :
mov     dx,2Eh
mov     al,F6h
out     dx,al
mov     dx,2Fh
mov     al,Mh            ;M=00h,01h,...FFh (hex),Value=0 to 255
out     dx,al            ;(see below  Note)

;Disable WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,00h           ;Can be disabled at any time
out     dx,al
```

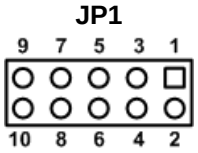
**Note***:*
*If **N**=00h, the time base is set to second.*
***M** = time value*
*00: Time-out Disable*
*01: Time-out occurs after 1 second*
*02: Time-out occurs after 2 seconds*
*03: Time-out occurs after 3 seconds*
*.*
*.*
*FFh: Time-out occurs after 255 seconds*

# Appendix B
# Digital I/O

## About Digital I/O

The onboard digital I/O has 8 bits. Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 4 inputs and 4 outputs where all of these pins are set to 1.




| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | DI0 (Bit0) | 2 | DO0 (Bit 4) |
| 3 | DI1 (Bit1) | 4 | DO1 (Bit 5) |
| 5 | DI2 (Bit2) | 6 | DO2 (Bit 6) |
| 7 | DI3 (Bit3) | 8 | DO3 (Bit 7) |
| 9 | GND | 10 | GND |

## Digital I/O Programming

Assembly sample code :

**Set functionality:**

```
;Start set DIO program:
mov     dx,2Eh
mov     al,87h          ;Un-lock super I/O
out     dx,al
out     dx,al

mov     dx,2Eh
mov     al,29h
out     dx,al
mov     dx,2Fh
mov     al,00h
out     dx,al
```

```
mov     dx,2Eh
mov     al,2Ch
out     dx,al
mov     dx,2Fh
mov     al,02h
out     dx,al
```

**Digital Input:**

```
;Programming DI[O..3] as input.
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,08h
out     dx,al

mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,02h
out     dx,al

; Set DIO digital input pins value.
mov     dx,2Eh
mov     al,E4h
out     dx,al
mov     dx,2Fh
mov     al,FFh
out     dx,al

;Read DIO digital input pins value.
mov     dx,2Eh
mov     al,E5h
out     dx,al
mov     dx,2Fh
in      al,N            ;Bit0~3 are DI0~3 state (1 High, 0 Low)
                        ;(see below  Note1)
```

**Digital Output:**

```
;Programming DO[O..3] as output.
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,09h
out     dx,al

mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,02h
out     dx,al

; Set DIO digital output pins value.
mov     dx,2Eh
mov     al,E4h
out     dx,al
mov     dx,2Fh
mov     dx,00h
out     dx,al
```

```
mov     dx,2Eh
mov     al,E5h
out     dx,al
mov     dx,2Fh
in      al,M            ;Bit0~3 are DO0~3 state (1 High, 0 Low)
                        ;When M=FF, all DO pins are high
                        ;(see below Note2)
```

**Note1*:***
*The **N** has 4 bits. Every bit's value is either "1" or "0".*
*" 1" means that the bit is input high.*
*" 0" means that the bit is input low.*

*Ex:*

*1. **N**=00h=00000000b*

| *NA* | *NA* | *NA* | *NA* | *DI3* | *DI2* | *DI1* | *DI0* |
|---|---|---|---|---|---|---|---|
| *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |

*2. **N**=08h=00001000b*

| *NA* | *NA* | *NA* | *NA* | *DI3* | *DI2* | *DI1* | *DI0* |
|---|---|---|---|---|---|---|---|
| *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |

*3. **N**=0Fh=00001111b*

| *NA* | *NA* | *NA* | *NA* | *DI3* | *DI2* | *DI1* | *DI0* |
|---|---|---|---|---|---|---|---|
| *0* | *0* | *0* | *0* | *1* | *1* | *1* | *1* |

**Note2*:***
*The **M** has 4 bits. Every bit's value is either "1" or "0".*
*" 1" means that the bit is output high.*
*" 0" means that the bit is output low.*

*Ex:*

*1. When **M**=FFh*

| *NA* | *NA* | *NA* | *NA* | *DO3* | *DO2* | *DO1* | *DO0* |
|---|---|---|---|---|---|---|---|
| *1* | *1* | *1* | *1* | *1* | *1* | *1* | *1* |

*2. When **M**=FCh*

| *NA* | *NA* | *NA* | *NA* | *DO3* | *DO2* | *DO1* | *DO0* |
|---|---|---|---|---|---|---|---|
| *1* | *1* | *1* | *1* | *1* | *1* | *0* | *0* |

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